

COAL AGE

McGRAW-HILL COMPANY, INC.
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Devoted to the Operating, Technical and Business
Problems of the Coal-Mining Industry

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Engineering Editor

Volume 25

NEW YORK, MARCH 27, 1924

Number 13

A Near Way to Oil and Coke

TWO problems of the domestic users of anthracite have been driving them to oil, to coke and even to bituminous coal—shortages of anthracite and its occasional poor quality. When a consumer buys coal, much of which came unwashed from some culm bank, he becomes utterly disgusted with anthracite.

Reputable operators declare he should sally forth and find out where he can get, say, Lehigh Valley, Glen Alden, Philadelphia & Reading or some other reputable coal unmixed with fuel of a lower quality. He should canvass all his friends to find out what company is delivering such coal. He should go far afield if necessary and buy his coal from some distant point even if he should have to pay a big price for delivery. Or he should band himself with other neighbors, buy a car-load from a reputable producing company, hunt up a teamster and open a set of books, making charges against, and collecting from, the recipients of the coal.

Perhaps he should, but then, perhaps his time is worth something. Then also he is not sure that he would be able to collect his money promptly and is not confident that he would get thanks instead of blame for his self-imposed activity. The coal may arrive too late or may not satisfy his friends or may be too expensive, being bought at the highest price at which "independent" coal is sold. Then again, the teamster may impose on him or fail to unload the coal promptly causing him to pay demurrage. The unloading will be expensive for he has no facilities for doing it. There are no scales, perhaps, convenient on which the coal can be weighed. So he decides not to make the attempt.

If he has to look around for a dealer who sells only good coal and is fortunate enough to have it on hand, that probably will take some time which he may not have to spare and when he does he may have to pay a high price for the hauling. As for buying on the statements of friends, that is not quite safe, for in time of shortage many kinds of coal good and bad are sold by the same dealer.

Consequently, he goes to oil or it may be to coke or even in some cases, where that is possible, to bituminous coal. If he puts in the first he has to expend so much for equipment that he is loathe to go back to anthracite. If he buys coke, he finds he has a little difficulty in adapting himself to it, but after a while he is apt to like it and he becomes a permanent coke buyer.

With bituminous coal he will have a little more trouble, perhaps an explosion or so, not severe, of course, but troublesome nevertheless, some annoyance from dust and soot and a few extra fires to light on some cold morning or on a return from a party or a theater. But perhaps he can excuse that because his cost is less and some of the difficulties can be avoided by careful firing, breaking up clinker, wetting down the coal pile and choosing the right kind of bituminous fuel. So he also may be lost to the anthracite market,

for a while at least, for how long depending largely on his location with regard to the anthracite region and on the forbearance of his neighbors.

No matter whether he did right or wrong, that is not the point at all. He did it, and the anthracite market is the loser and mark you! the owner of the unwashed culm bank does not suffer the loss. That individual is not continuously in business. It is the company that looks to stay in the market that loses that trade, not because it has been dishonest but because it has said it was none of its business if other people did fleece the purchaser, because it has said that the buyer should beware and if caught should demand restitution, because it has believed its own bright coal would "shine like a good deed in a naughty world," whereas it did nothing of the sort. Good coal, after a few deliveries of low-quality product, shines only like a "will o' the wisp."

Those Bad Boys of Nova Scotia

PRESIDENT LEWIS' good right palm must itch to spank the reds of the Nova Scotia union district. For years, in that distant corner of unionism, they have been cutting up naughtily. When Lewis spoke they thumbed their noses and threw mud balls at the union king like bad boys on the other side of a creek from their scolding parent. And now they have upset all precedent by refusing to accept a wage advance the organization got for them. Dear, dear, dear! What to do! What to do!

The difficulty dates back almost to the very year in which the independent Nova Scotians in their separate union were induced to join the United Mine Workers. Their independence within the union has grown steadily stiffer. About 1921 it became painful. Bolshevism colored the district so vividly that the miners once voted to join the Red Trade Union Internationale of Moscow, and later withdrew their petition. Toward Lewis, since then, the policy of the district evidently has been: "No matter what he wants; we don't want it."

In November, 1921, when their agreement expired, Lewis urged them to demand a new one; so they did not. Two months later, operators cut wages thirty-seven per cent. Lewis said strike; so they worked. He advised them later not to "strike on the job"; so they did that, too. When the great strike of 1922 started, Lewis wanted them to come out and make it unanimous. They stayed in and dug union coal. In August, when they finally struck, Lewis thought they should demand a return to 1921 wages. They accepted reinstatement of only seventeen per cent of the thirty-seven per cent cut. This left them twenty per cent short of 1921, and they went back to work under contract at \$3.25 a day—the lowest day rate in any union field.

Then, last fall, while Lewis was negotiating with the anthracite operators and publicly declaring the union's belief in the sanctity of contracts, the union miners of

Nova Scotia violated their contract by striking. That mudball spattered Lewis good. The MacLachlans and Livingstones of Nova Scotia were viciously happy. "What do you mean by doing such a thing?" Lewis wired. "None of your business" they replied. Mr. Lewis' collar nearly burst. He dissolved their district organization and named provisional officers. These are the ones who induced the operators, Feb. 11 of this year, to raise day men twenty-five and thirty cents, loaders seven cents a ton and pick miners eight cents. And now the district rejects the increase 5,617 to 3,145!

This sort of thing, together with recent periods of violence, makes Nova Scotia a problem for Lewis, the coal operators and the whole industrial fabric of eastern Canada. About the only hope lies in a change of attitude by the men. To bring this about the operators can only pay fair wages, adopt a policy that is stern but absolutely just, peaceful and humane, and stick to it. Lewis, to regain district control and respect for the contracts he makes, might try colonizing Nova Scotia with some of this excess of loyal union men from the United States—if any willing loyals can be found.

Meantime if the 5,617 anti-Lewis miners were to go on working at the new wage but spitefully scorning the contract, the region would be non-union, and the bad boys of Nova Scotia would have accurately landed another mud ball. Oh for a chance to wield that good right palm!

At Castlegate

UNFORTUNATELY the mines in the Rockies have their own particular troubles or rather they have the troubles of other mines in accentuated form. We may therefore look to them to set the pace for the rest of us. Many excellent practices originated around Castlegate. Many schemes for making mines safe came from those workings, and good plans they were too, though this disaster shows they were not good enough.

The Utah Fuel Co. will have to start over again and earn a reputation by being among the first to protect its mines by adobe or rock dusting. The material is readily available, only too available, most people will say who have traveled through the arid stretches nearby Castlegate with little but adobe in sight over large areas.

Dr. Wheeler said the other night that no one should be afraid of firedamp. It simply won't explode unless the percentage of methane reaches the explosive limit. And so it is with coal dust, it won't explode if every last pile of it is so wet that it will ball in the hand and if the right explosive is always rightly used and if trolley wires don't fall and arc, and if a half a dozen kinds of mistakes aren't made.

Coal dust is perfectly safe, if all precautions are always taken everywhere, but they are not, never were and never will be, so why expect it in any one instance. Resting lives and property on eternal and universal watchfulness when men are known to fail frequently is a senseless gamble with death if better ways are known. Discipline is all very well as far as it goes, but any safety which has to rely heavily on discipline will sometimes fail and if a mine can be made so safe that discipline is rendered less necessary it will avoid startling headlines and be less likely to subject its owners to a staggering loss.

Rock dust is not only a cure for explosions but an active antidote. It will not only prevent them but limit

them if they start. A little breach of discipline that will let them commence will be corrected therefore by the condition of the roadways that such explosions will meet as they travel on their way. Consequently it is a double protection, one half of which, that on the main roadway being subject to ready and easy inspection by everybody. The color of the dust is a reliable guide, and the frequency of the application is a ready matter of record.

It is not an inexpensive cure. However, in Utah it is not so expensive as in some other states which do not have adobe to dust with. And after all a million dollars or more of a loss such as the Castlegate mine sustained is so large that any mere maintenance cost would be years in equalling it. With that in view, rock dusting becomes a saving rather than an expenditure and wise indeed is he who does not omit it.

Small Mines Have Advantages

TO HEAR the statisticians talk, one would think the small mine had never a chance, but with its short haul, its low ventilating pressures and the possibilities of greater co-ordination between its individuals, conditions are not really so perplexing after all, if care has been taken to keep the mine in good operating condition. The small mine does not as a rule have much capital expenditure on which to pay interest. It is usually so located that its drainage problems are not difficult. Given good management the small mine should be able to hold its own, till it gets too much extended, till it becomes that saddest of all mine properties, a big mine with a small capital outlay.

It used to be and probably still is true that many mines continue operating till they reach a certain extension when they become snuffed out from lack of money to provide for the needs of so far-flung an operation. Happy is the man whose mine is nowhere over a mile from the tipple. Some people may be willing to buy a mine on the basis of trackage length but after they have operated it awhile they realize that if they want cheap coal long haulages are not desirable.

Airtight Compartments in the Coal Industry

AS ONE travels around the coal regions he realizes how provincial parts of it are. Perhaps least provincial sections are Pittsburgh and Chicago. Possibly St. Louis might be added. There are sections bound in by mountains with poor means of communication which positively do not have any connection with the outside except through technical literature. The towns in which these secluded people live may be large enough to fill the outsider with interest and respect but the roads leading from them run in only two general directions or they are so far away from other mining sections that technical provincialism is quite marked.

The only cure is in technical reading. First-hand information is not available. The press of business prevents traveling, and neighboring operators do not invite visitors, so nothing remains but the written word. Where social life is well developed, where Rotarians, Lions, Kiwanis, Masons, Elks, Moose and other organizations monopolize the spare moments there is no time for study and the isolation is complete. Still, progress is the word of the hour and more time certainly should be given to obtaining from books and periodicals what fails to travel by word of mouth.

Steeply Pitching Coal Beds, Undercut by Machine, Are Tapped by Slope in Shales Below Them

Seam Gradient 58 per Cent—Coal Does Not Crop Anywhere on Face of Hill Fronting Tipple—Slope Will Not Cut Seam Till It Has Been Driven 2,600 Ft. but a Slant Is Provided to Tap Coal 1,900 Ft. from Portal

By CHARLES M. SCHLOSS
Denver, Colo.

BACK in the frontier days of the West, "Remember the Alamo!" was the stirring battle cry of the patriot Texans, when, fighting against heavy odds, they annihilated the Mexican forces led by Santa Anna and made Texas an independent nation. Today a new Alamo is being made memorable. In spite of obstacles, and in the face of adverse conditions prevailing in the coal industry, a mining enterprise headed by W. B. Lewis of New York is bringing one of the newest mines of Colorado, the Alamo, into production. The name chosen is reminiscent of one of the most picturesque episodes in the romantic past of the great West.

Careful search was first made for a virgin territory containing a coal equal in quality to that produced by the Oakdale mine—also situated in Colorado and operated by the interests that control the Alamo. Finally a tract of 640 acres lying 16 miles north, and slightly to the west, of Walsenburg was optioned and drilled, with the result that two workable beds of coal 39 ft. apart were proved suitable for mining. The upper bed is $6\frac{1}{2}$ ft. thick, and the lower contains 10 ft. 5 in. of hard bituminous coal believed to be the Cameron seam. The drill holes proved about 18,000,000 tons in the two measures.

In order to develop the mine quickly and place coal on the market in the least possible time, an executive committee consisting of Harry F. Nash, vice-president and general sales agent, E. H. McCleary, general manager of operations, and J. H. P. Fisk, engineer, all of whom reside in Colorado, was appointed. These men had authority to adopt plans, purchase material, and in fact, push through to successful conclusion all construction and development. All this work was done by con-

tract under the supervision of Mr. McCleary and the engineers, Douglas, Corey & Fisk, of Trinidad, Colo.

With the necessary preliminaries attended to, active work was started on Jan. 1, 1923. Since that time a camp has been constructed, mine buildings erected, and five miles of railroad built as a connection between the mine and the joint track of the Colorado & Southern and the Denver & Rio Grande Western which serves the mines between Walsenburg and Tioga, the former terminus of the line.

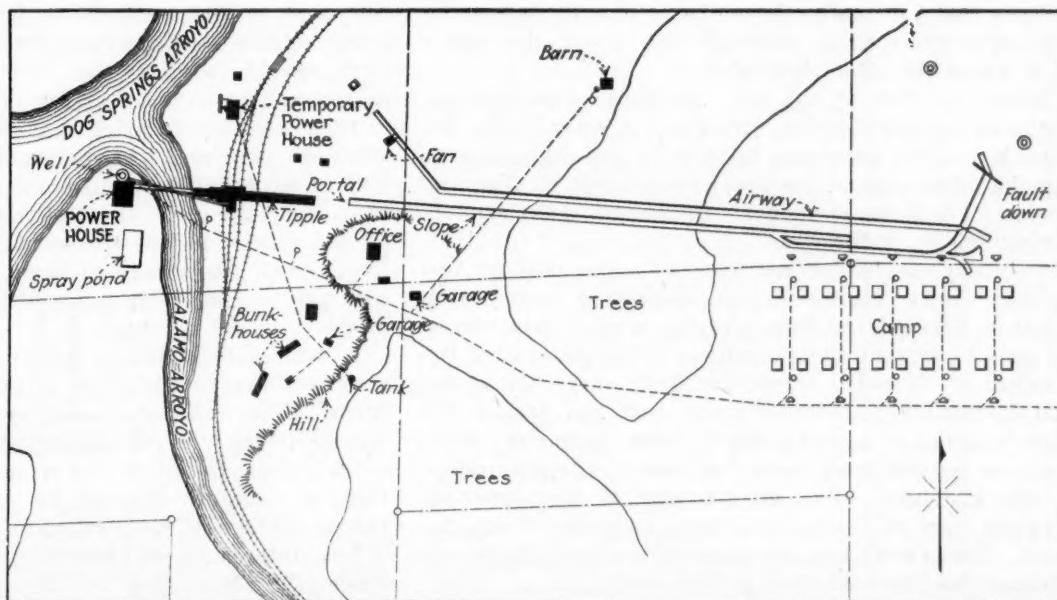
The water problem at this mine was solved by sinking a well, 11 ft. in diameter, through 45 ft. of quicksand. In this operation a continuous concrete ring with a metal cutting shoe was employed. A flow of 200 gal. per min. was obtained. The well is located a few feet from the power house, and the water is pumped through a 4-in. wrought-iron pipe line, a mile long to an elevated reinforced-concrete tank of 50,000-gal capacity. Ample pressure is thus afforded for fire protection at both tipple and townsite.

The Alamo camp is situated on a hill with the Spanish Peaks towering in the distance on one side and the supposedly volcanically formed Black Hills on the other, in the immediate vicinity. It thus possesses real picturesqueness. The mine is separated from the town by a dense piñon grove, rendering it impossible to see the mine from any part of the town. This physical detachment lends an atmosphere of independence to the camp; the workman at home at the end of the day is not constantly viewing the scene of his labors.

Twenty homes, now completed, are built in two lines paralleling a central plaza or boulevard, constituting one arm of a cross. They represent one-quarter of

FIG. 1
Alamo Mine

This shows the general location of mine and camp. It will be observed that the power house and spray pond are on a point where two arroyos converge. Coal is brought to this plant from the tipple by means of a conveyor line. Although the mine workings underlie the town the mine buildings cannot be seen from it, being obscured by a piñon grove.



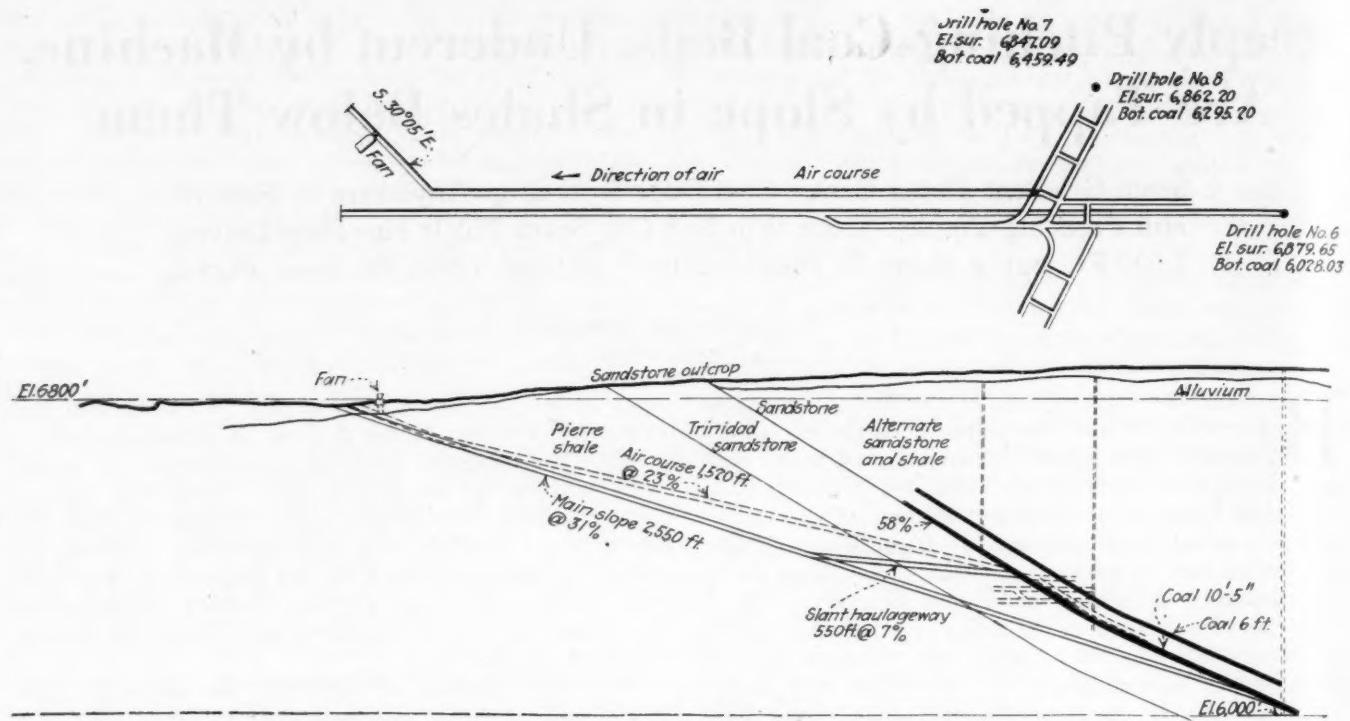


Fig. 2—Plan and Elevation of the Rock Slope, Slant and Coal Workings

The coal pitches under the hill at a 58-per cent gradient, the main slope being driven in the rock underneath it at a grade of 31 per cent. The airway on the other hand is driven at a 23-per cent gradient. A 7-per cent slant haulageway is driven off the main slope 1,300 ft. from the portal, reaching the coal at the same elevation as the airway.

the contemplated townsite. All special town structures, residences and other buildings will occupy positions in one or other of the four quadrants. In outside appearance the houses follow the architecture of the world-famous Alamo, as in fact do all the other buildings. Several bungalows of different designs have been erected, all containing four rooms and two closets and all made of cement brick, manufactured by the company at Alamo. This has proven a means of materially reducing the cost of both construction and maintenance.

Because of the position of the coal the underground development is of a most unusual character. The two beds underlie a hill and dip steeply from west to east. The pitch, beginning at the western edge of the deposit, is 58 per cent. This decreases materially, however, as the measures are followed to the eastward under the hill. On the western slope of the hill the coal does not outcrop, but the sandstone which is directly below the coal outcrops several hundred feet above the valley floor where the tipple is located.

From the foot of the hill, the main slope and air course have been driven straight eastward. The inclination of the slope was fixed at 31 per cent so as to tap the under side of the lower seam 2,600 ft. from the portal. The slope is 8x10 ft. in over-all cross section, giving 7x9 ft. in the clear.

The plan called for entrance into the coal at two points. Thus, when the main slope had been driven 1,300 ft. through the Pierre shales, a slant was turned off on a 7-per cent down gradient. This penetrated the stratum of Trinidad sandstone lying above the shales and immediately underlying the coal and tapped the lower coal bed at a point 1,900 ft. from the portal. Thus coal can be produced while the rest of the main slope is being driven. The development of the upper or western, part of the mine is being projected from this slant. These workings are expected to supply the mine's tonnage for the next four or five years.

An aircourse was sunk at the same time as the main slope and on a 23-per cent gradient. This intercepts the coal at the same elevation as the slant. Both passages have been timbered throughout their entire length in the shales with three-piece red-spruce timber sets placed on 5-ft. centers and lagged on top and on both sides.

The main slope is as straight as an arrow, adhering uncompromisingly to the set pitch and direction. Manager McCleary says of it: "There were several days when at a certain hour the inclination of the sun's rays coincided with the inclination of the slope, and the actual sunlight lighted up the face, 1,500 ft. in. The alignment and uniformity of grade will be so exact that this condition will prevail at a point 2,600 ft. from the portal where the coal will be struck."

The pitch of the bed, 58 per cent at the west side of the property, might prove alarming to one unaccustomed to the methods to be employed at Alamo. Many old-timers, when considering the steepness of the pitch, would doubtless say: "That's easy; drive level entries and turn chutes up the pitch." They would fail to take into consideration that the market to be served demands lump coal. Lump commands a high price, but with chute mining, because cutting machines could not be used up the pitch, the coal would necessarily be shot off the solid, and this method of mining yields a relatively small percentage of lump. Consequently, if the coal were mined by chute methods, the income from the property would be small.

It was realized that a better system was available, a system that would yield much greater financial returns. This was the panel system with level cross entries driven at right angles to the slope, butt or panel entries down the pitch and rooms turned on the strike. Cutting machines thus can be applied successfully, and the percentage of lump substantially increased.

It is interesting to know that shortwall machines are successfully operating on this pitch of 58 per cent.

The work done thus far has been the driving of the cross entries on the level and the dip entries on the pitch. The machine sumps in at the lower rib and cuts to the top without appreciable effort. Because of the width of the cars and the 42-in. gage used, the track, though laid near the lower rib, is considerably higher than the lower corner where the machine loads and unloads from its truck. It is no easy task to load it from this depression.

Two machines, a Goodman universal control and a Sullivan Ironclad were purchased. These undercutters operated on 3-phase, 60-cycle, 440-volt current. Both have their reels mounted on extensions from the truck. This is necessary, because the machines are handled by hoisting ropes and the trailing trucks, if used for carrying the reels, would frequently derail when negotiating curves.

Experience in other mines has shown that this is what happens, though it is admitted that trailing trucks are advantageous in flat beds. Operators of the Sullivan equipment use jack pipes to maneuver the machine at the face, whereas Goodman machine runners drill holes in the ribs, set anchors in them to which they hook their ropes, thus avoiding the labor of handling the heavy jackpipes necessary for this high coal.

Hoists placed at the head of each panel slope will gather the loads from the room necks and deliver them to the partings on the level cross entries. Thence, locomotives will pull them to within reach of the main hoisting rope. The panel hoists will be so placed that no rope from them will cross a haulage road. The main hoist, located in the power plant, is rated at 25,000 lb. of rope pull and a speed of 900 ft. per minute. The diameter of the drum is 84 in. and the drum has a 60-in. face—large enough to wind 3,500 ft. of 1½-in. rope in not to exceed four layers. It is equipped with a 96x12-in. wood-lined face, parallel-motion, and oil-operated post brake. This machine is driven by a 600-hp. motor.

The slope track is laid with 60-lb. steel, the level entries with 30-lb. and the rooms and panel entries with 20-lb. rails. The cars weigh 2,800 lb. and hold an average of 5,000 lb. of coal. Being equipped with roller bearings, they are easily moved.

Each pair of level entries will be about 2,600 ft. long and will be served by a separate split of air which will also ventilate the three to four sets of panel entries turned off them. Six pairs of levels will be turned off each side of the main slope. This means that a like number of main splits of air must be provided. A cement-block undercast has been built under the first

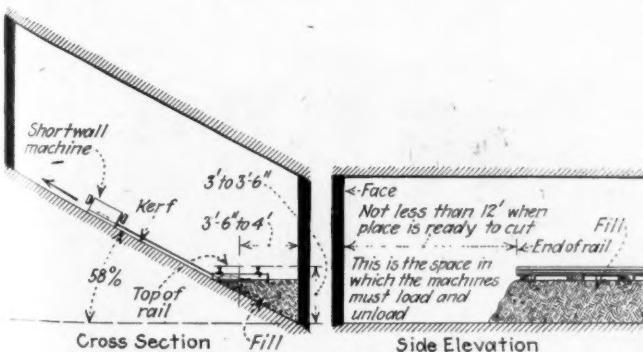


Fig. 3—Section and Elevation of a Room

This shows the difficulties under which the undercutting machines must be operated. Despite these handicaps, which will be at once appreciated by mining men, the undercutters have given excellent satisfaction.

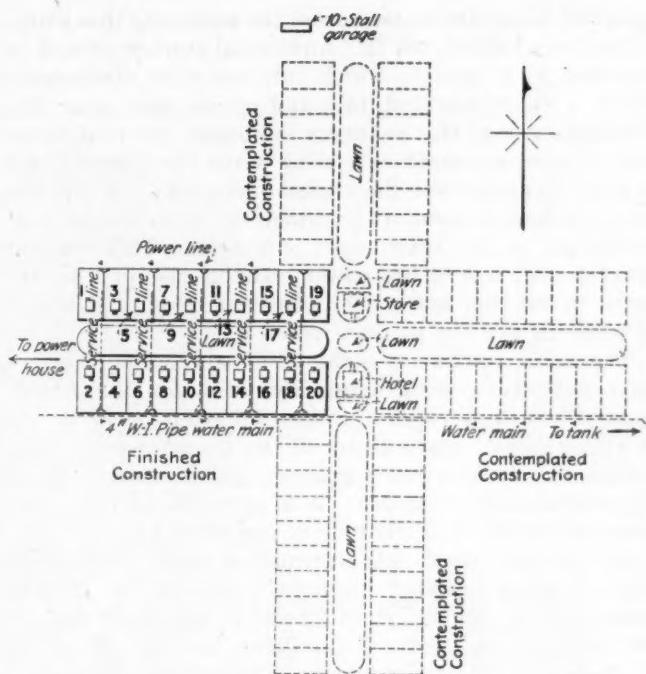


Fig. 4—Alamo Village Laid Out with Grass Plots on Street Centers

Only one arm of the cross has as yet been completed but the entire projected layout is shown in this illustration. It will be noted that a simple, neat and aesthetic design has been attained.

left or north level. This is provided with a concrete roof reinforced with 20-lb. rails and old haulage cable. Because of the heavy pitch of the coal an overcast would have made an impossible traveling way for men and mules. Air is exhausted by a 5x7-ft. multi-blade fan with a capacity of 150,000 cu.ft. per minute against a 2-in. water gage. This ventilator is reversible.

The tipple, built largely according to Mr. Nash's suggestions, was designed so as to provide well-prepared coal. The main hoisting rope pulling over the tipple deck, lands the trip on a car retarder, from which the cars are fed one by one over the scale to the rotary dump, thence into the kickback, and onto the empty track. Coal is fed from the dump hopper to the screen. The small sizes are re-treated in a revolving screen fed by a continuous bucket elevator, and from it deposited in two bins.

Nut and lump pass to loading booms which are hinged and pivoted at the screen ends so that they may move in both horizontal and vertical planes. The discharge ends are carried by 3-ton overhead electric hoists, suspended by trolleys from I-beams spanning the respective tracks. When swung at an angle across the track the goose-necks in the booms permit them to reach over the sides of gondolas and discharge near their bottoms.

If swung parallel to the tracks, the booms discharge to curved right-angle chutes leading to extension box-car loaders, a belt type for nut and a drag type for lump. These loaders reach over 16 ft. into the ends of the box-cars and load with a minimum of breakage. Cars can be filled to capacity at a conveyor speed of 290 ft. per min.

A cement-brick building of Alamo architecture, 60x70 ft. in plan, houses the modern power plant, designed by Wood & Weber, consulting engineers of Denver. The two dominant influences in the design of this structure were the desire for economy in equipment and for a minimum of operating labor cost.

By a rope-and-button conveyor slack coal is transported

from the bin at the tipple across the arroyo to this plant, a distance of about 400 ft. Additional storage of coal is provided by a pit into which this conveyor discharges. When a chain-operated rack-and-pinion gate near the discharge end of this conveyor is opened, the coal drops into a screw conveyor extending across the power plant to small hoppers over the stoker magazines. A centrifugal discharge elevator is provided, to raise the coal in the pit to the same screw conveyor. This feature insures operation of the power plant in case of a breakdown to the rope-and-button conveyor or of a shortage of slack in the bin at the tipple.

The boiler equipment consists of two 250-hp. marine-type water-tube units originally built for the Emergency Fleet Corporation. Both are stoker-fired. Water is automatically maintained at the proper level in the boilers by a feed-water regulator, and the forced draft is automatically controlled. A drag-chain conveyor disposes of the ashes at the rear of the plant.

An electric hoist was considered more economical than a steam-actuated machine under the conditions prevailing at Alamo. Heavy fluctuations in demand on the 600-hp. hoist motor necessitated the installation of a 1,250-kw., 2,300-volt, 3-phase, 60-cycle turbo-generator, rated at 80-per cent power factor. Steam is exhausted

into a jet condenser to which cooling water is supplied from a concreted spray pond. All the water entering this pond is first passed through a softener. Once the pond has been filled with softened water it is necessary to treat only such makeup water as is needed each day.

The complete power plant including not only the boilers but the hoist also is housed in the one large room. To keep the investment down, only the bare necessities of operation have been installed. The economy practised can be appreciated from the fact that the installation cost per kilowatt of capacity including the hoist, was less than \$100. The arrangement is such that additional generating equipment can be added from time to time as needed. For the present, an engine-driven alternator used in the temporary plant employed for construction work, is being moved to the power plant as an emergency unit.

Taken all in all this property is expected to become one of the most interesting in Colorado. Though only the lower bed is to be worked for the present, the upper one contains 6 ft. of good coal and will be entered whenever the time seems opportune. It is possible therefore, that the coal industry of the West, may have occasion to "Remember the Alamo" for a long time to come.

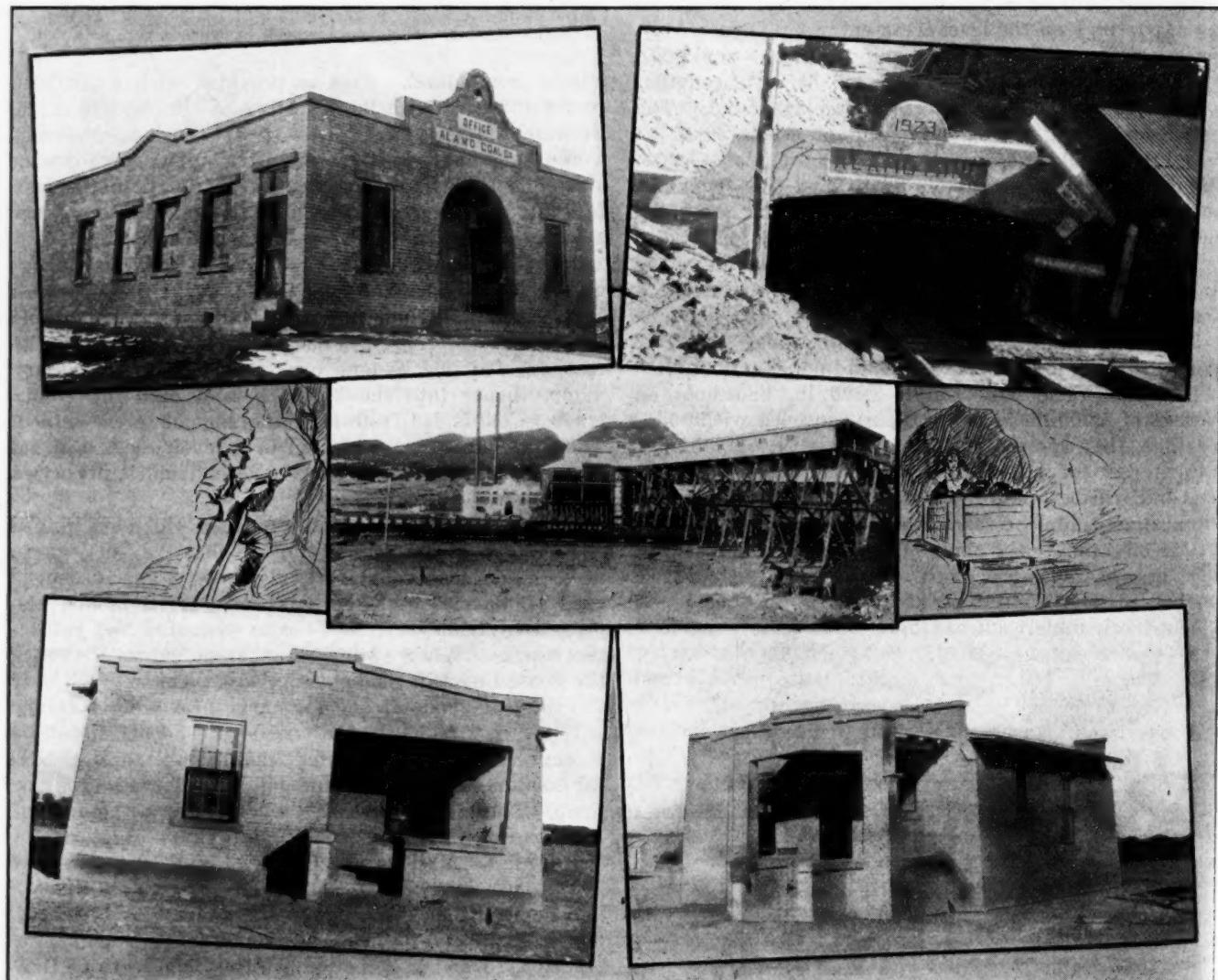
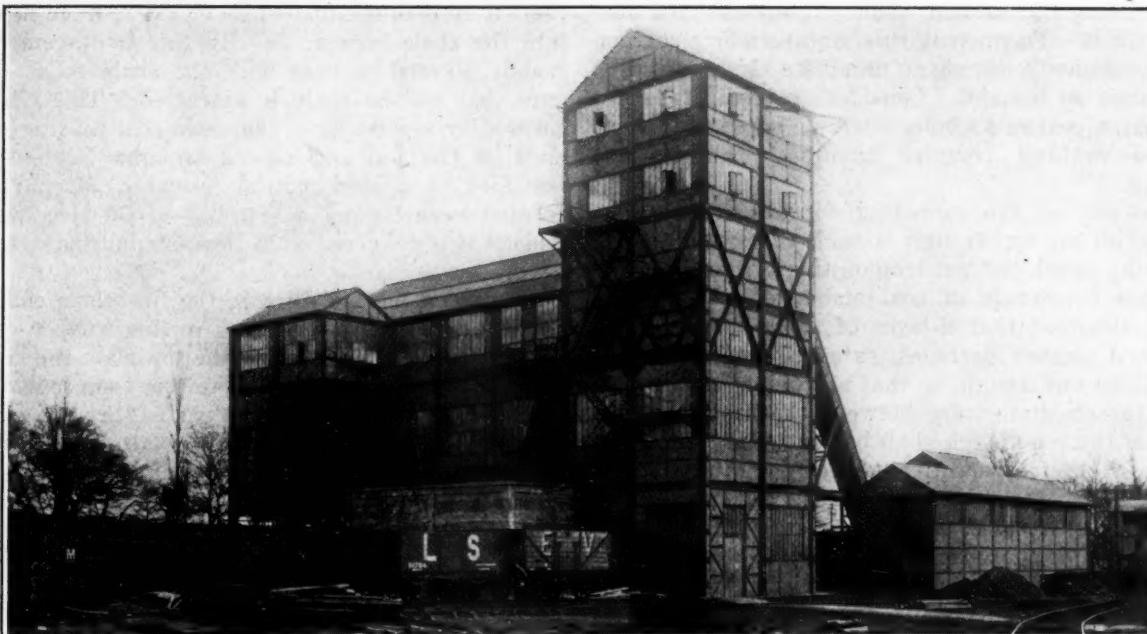


Fig. 5—Everything at Alamo Except the Tipple Is Built of Permanent Materials

At the top, the office and slope mouth; in the center, the tipple, and at the bottom, two bungalows. Concrete, reinforced concrete and cement brick are the materials used. This kind of brick can be manufactured at the mine more cheaply than ordinary brick

can be purchased. Appreciable savings were accordingly effected in house and general construction. Every building in Alamo is of characteristic Mission architecture, simple but effective, the camp as a whole presenting a harmonious picture.



Ormonde Colliery, Butterley Co. near Derby

How Washer at British Colliery Readily Treats Mixed Coals of Widely Varying Character

Coal Up to 3-In. Cube Is Separated Into Four Sizes and Each Size Separately Washed—Adjustment to Suit Any Kind of Coal Readily Can Be Made

BY C. H. S. TUPHOLME
London, England

A RHEO-WASHER designed to prepare 100 tons per hour of coal up to 3-in. cube—the first washer of its kind to be erected in the British Isles—is located at the Butterley Co.'s Ormonde Colliery, near Derby. The unwashed coal from the screening plant is brought by a canvas conveyor, A (see Fig. 1), running at 350 ft. per minute and capable of conveying 100 tons per hour. The coal is delivered into the coal storage hopper B. Provision also is made to enable coal from other shafts to be washed by installing dumps, C, for end-gate cars. These are so arranged that it is immaterial which end of the car is foremost. These dumps each have a separate motor, spur drives to a rope drum which is connected to a block and tackle arrangement which lifts the hinged platform and so tips the car. This method provides a rapid means of emptying cars without the need of clips or damage to the sides of the car.

From the bin for the unwashed product the coal is raised to the shaking screen, D, by means of the elevator E, which has a capacity of 100 tons per hour. The frame is dustproof and has an adjustable sliding door at the bottom to regulate the feed. The opening and closing of this door sets up enough disturbance in the

bin to prevent the coal from arching and so destroying the regularity with which the coal is delivered to the elevator. The unwashed coal then passes down a forked chute, F, having a regulating door to insure equal distribution of the coal to each of the side-by-side balanced shaking screens, D, which size the coal into 0 to $\frac{1}{8}$ in., $\frac{1}{8}$ in. to 1 in., 1 in. to $1\frac{1}{2}$ in., $1\frac{1}{2}$ in. to 3 in. With this type of screen the coal has a transverse zig-zag movement down the perforated plate, giving effective screening. Although these screens are working at a considerable elevation above the ground they are so well balanced that it is impossible to detect any vibration of the building.

The various sizes of coal are then delivered from the screens by chutes to the top of their respective bins, each having a capacity of 50 tons. These bins are provided with spiral chutes G to prevent any likelihood of breakage.

Following the 0 to $\frac{1}{8}$ -in. coal through the process of washing, the door at the bottom of the bin is opened, allowing the coal to join the flowing water in the top trough. It will be readily understood that in the trough a classification takes place between the shale and the coal, its greater specific gravity and its frictional

resistance to travel, causing the shale to form a bed in the bottom of the trough. It would now be possible to allow the shale to fall through a slot in the trough, but in so doing the suction would cause some coal also to fall with it. To prevent this, an ascending current of water sufficiently strong to eliminate this possibility is introduced in the slot. Considering the installation for 0 to $\frac{1}{2}$ -in. coal as a whole, it will be noted that there are three washing troughs, having in all twenty-four traps.

The velocity of the ascending current at the first two traps on the top trough is such that most of the shale is eliminated, the last trap on the top trough being set to pass a mixture of coal and shale. It will be readily understood that a layer of shale consisting of smaller and smaller particles, extends almost the full length of the top trough, so that all that is required is that the intermediate traps between the first trap and the last on the top trough shall be regulated to suit the condition at their respective sections of the trough. In the second trough the traps are similarly adjusted, but as the quantity of coal has considerably diminished, the shale can be more readily extracted, while in the third trough we have a mixture still containing coal. This mixture is conducted to the rewash elevator *H*,

and raised to the head of the first trough to be re-washed.

The pure shale is collected in a further trough and carried by it to the final shale elevator, *K*, to be dumped into the shale hopper, *L*. By this arrangement some coal is allowed to pass with the shale so as to make sure that all the shale is extracted. This coal is recovered by rewash. The clean coal passing over the ends of the top and second troughs is conducted to the foot of a slow-running elevator, *M*, having perforated buckets and a capacity of 50 tons per hour, whence it is delivered on to the distributing scraper conveyor, *N*.

To reduce the moisture in the fine clean coal, a new feature has been incorporated in this scraper conveyor. As the coal is scraped along the top plate the resistance to motion causes the coal to be compressed. This squeezes out the water, which passes through a series of perforations. Any coal that may also pass through is recovered, and by means of a chute is delivered to the trough. Then, by means of doors on the lower tray, the coal is distributed to some one of the five storage drainage bins, where it is allowed to drain for a few hours. As is generally understood, it is the particles of clay which tend to hinder drainage from the bin, but by this system this undesirable material is removed in the washing.

To convey some idea of the flexibility of the device, and how readily the installation may be adjusted, this plant has on several occasions washed batches of 60 tons of coal from other mines where the coal has quite different characteristics from that usually washed, and in a few minutes all the necessary adjustments have been made and results have been obtained as satisfactory as when washing the coal of the Ormonde Colliery.

In the treatment of the larger sizes of coal the door at the bottom of the bunker is opened, allowing the coal to join the flowing water in the trough. The classification is obtained in exactly the same way as for the fines, but instead of having three troughs only one is used. The reason for this is that naturally the larger classes of material need a shorter length to take up their relative positions in the bottom of the washing trough, and only two traps are required.

The first trap, *F*, extracts pure shale; the second, *R*, extracts any remaining shale and some coal. This mixed product is then raised by means of the rewash elevator, *S*, to the head of the trough to be rewash. The shale from the first trap is raised by means of an elevator, *T*, where it is finally discharged into the shale

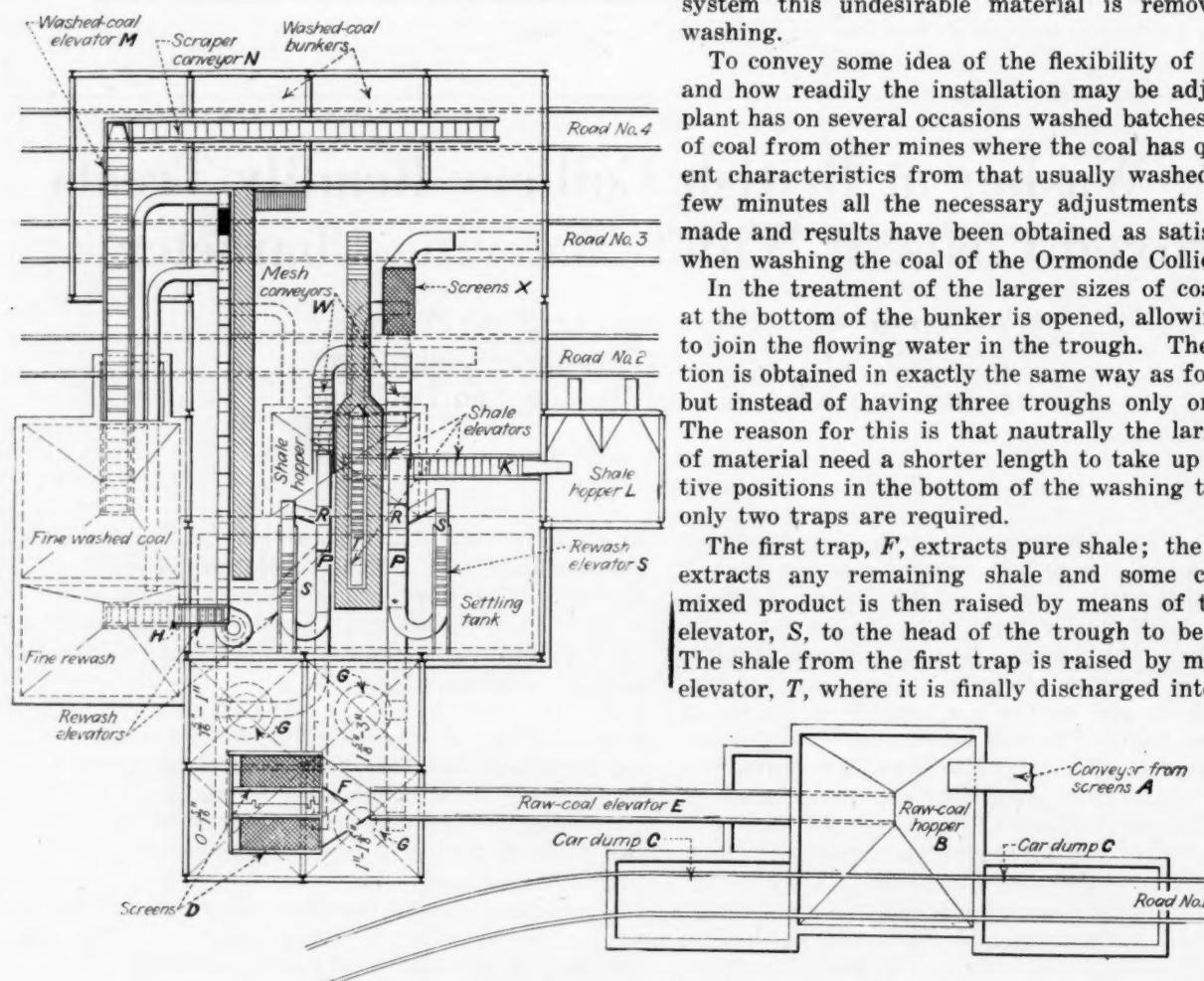


Fig. 1—Plan of Ormonde Washer Showing Treatment by Flow Method, Screens and Bins

Coal enters over a belt at *A* or by way of car dumps *C*, into raw coal hopper *B*. It is carried by an elevator *E* to a chute which feeds two screens *D*. These separate the coal into four sizes. Spiral chutes deliver the coal to four bins, one for each size. The finest size goes to the flow washer on the left. The fine coal is taken off the end, and the shale and rewash coal go to their respective bins. The elevator *H* carries the rewash back to the top of the head trough for rewash. An elevator *K* raises the shale to the bin *L*. The clean fine coal is raised and drained by elevator *M* and conveyed by scraper conveyor *N* to two

bins over Road No. 4. In the two central flow-washers pure shale is removed at *PP* and rewash material at *RR*. The first is removed by elevator *T* and goes to the shale bin *L*, the second is returned to the top of the upper flow washers by elevators *SS* and rewash. The fine coal goes to Road No. 2 or Road No. 3, according to the size, being elevated for the purpose in drainage mesh elevators *W*. The larger size is taken to screens *X* for sizing, the degradation coal going thence to the fine rewash tank for treatment on the flow washer for fine coal, the coal being lifted by elevator *H*.

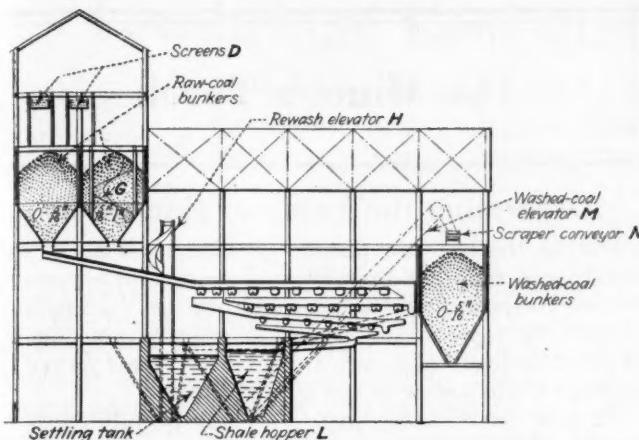


Fig. 2—Elevational Section Through Fine-Coal Washers

This elevation shows the three washing troughs with their twenty-four traps, with the screens *D*, the raw coal bunkers for 0 to $\frac{1}{8}$ in. and $\frac{1}{8}$ to 1 in. coal respectively, the rewash elevator *H*, the settling tank, shale hopper *L*, washed-coal elevator *M* and washed-coal bin.

bunker. The clean coal passing over the end of the trough is conveyed by means of a drainage mesh conveyor, *W*, to the small screen, *X*, where any fine coal is extracted and directed to the foot of the fine rewash coal elevator, *H*.

The washed coal passing over the screen is loaded directly into railroad cars by means of a telescopic loading chute, *Y*, as shown in Fig. 1. The Ormonde washery has two washers for the preparation of large sizes which are, with the exception of the screen, quite similar.

From each of the tanks containing shale, fine washed coal and fine-coal rewash, the water overflows to a main settling tank, from which the main circulating pump, having a capacity of 90,000 gallons per hour, takes the clarified water and lifts it to the overhead tank, which provides the constant head of water for both the horizontal flow and the ascending currents.

In this system of washing little or no fine material is

caused by the actual process of washing, but the very fine particles already in the coal, which settle at the bottom of these tanks and of the settling tank, are, by means of flushing valves, collected in a sump. This material, which for the want of a better name is called sludge, is finally pumped and mixed in the tank with the fine washed coal.

By this method of dealing with the sludge the settling tanks do not need to be shoveled out and waste of material is eliminated. The percentage of sludge is small compared with the whole quantity of coal handled. The washed coal is very clean, the total ash content being well within the permissible limit.

The building is of steel, with 4½-in. brick paneling. The fine washed-coal bins and the unwashed screened-coal bins are of steel, brick filled in cement mortar, and lined with a thin layer of cement. The shale tank and the settling tank are constructed of brick-work in cement mortar and lined with cement. The fine washed coal and the fine coal rewash tanks were made of different materials in order to ascertain which of the two types was preferable as regards efficiency and relative cost. The washing troughs and curved chutes from the rewash elevators are constructed in reinforced concrete. This material is recommended for troughing when the water is of a corrosive nature.

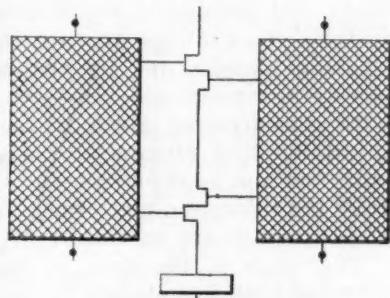
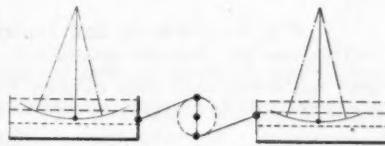
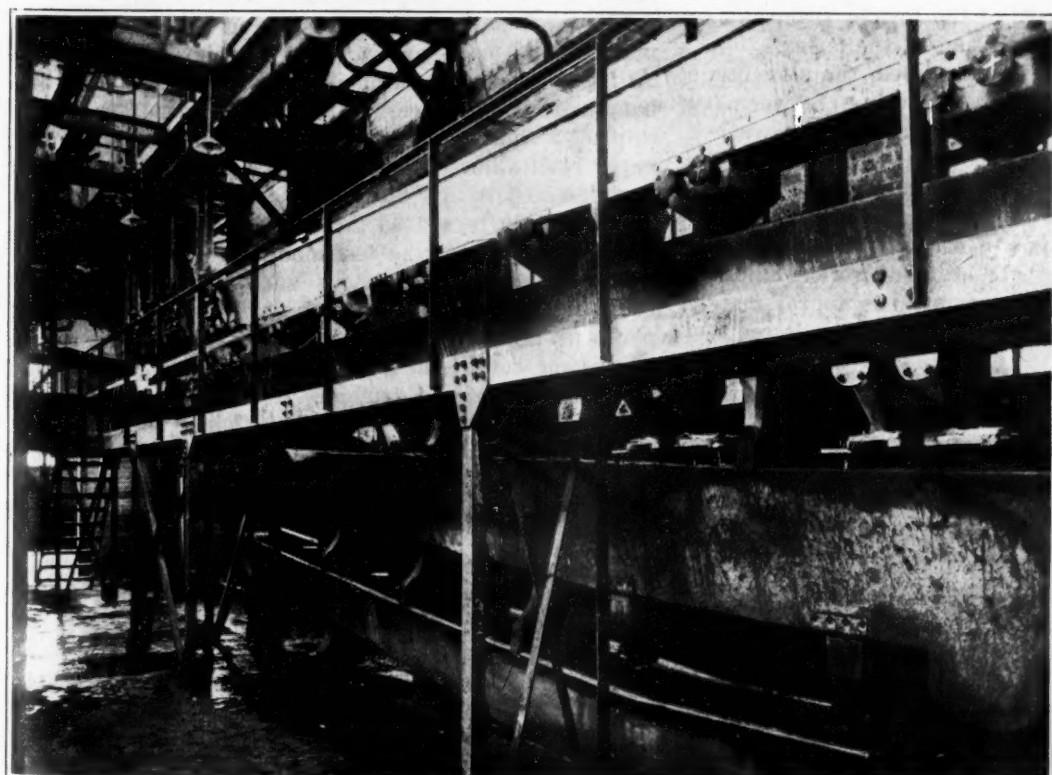


Fig. 4—Screens

Above an elevation, below a plan. The screens swing side-ways and not end-wise which is the usual practice. Vibration is fully counterbalanced.



**FIG. 3
Troughs for
Fine Coal**

The fines are washed along the troughs at varying speeds depending on the specific gravity and shape of the material. Heavy and flat particles being slow fall readily into traps set in their path. A current of ascending water sustains the clean product. middlings and coal are taken off at some of the traps and passed to the washer to afford a larger quantity of material of a specific gravity greater than coal and less than slate, thus separating the two effectively and aiding in their segregation.

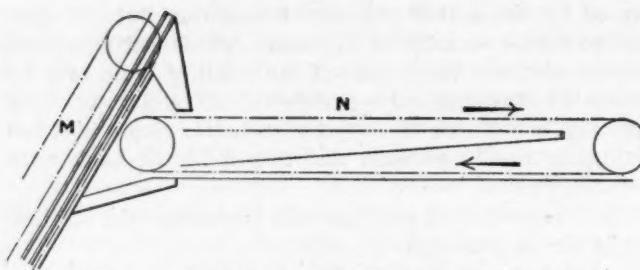


Fig. 5—Draining and Distributing Conveyor

To reduce the moisture in the fine coal a scraper conveyor is used which squeezes the coal through a series of perforations. Any coal which may pass through these holes falls on a chute and returns to the trough, an unperforated chute being provided for that purpose.

The roofs are supported by steel trusses and are covered with slate wired to running single purlins. The floors and gangways are of concrete. Alongside the installation, gantries are provided for inspecting the washing troughs, and for regulating the valves. The elevators, screens and conveyor are sturdily designed, with consideration given to facilities for lubrication, inspection and renewals. Each machine is provided with fast and loose pulleys, and the belts can be shifted from the inspection platforms. Generous walking room and staircases are provided everywhere.

The whole of the plant is electrically driven and is provided with five electric motors having a total capacity of 150 hp., only 100 hp. being needed for normal working of the plant. This is equivalent to 1 hp. per ton of coal washed per hour. The water required to compensate for losses in the coal is 40 gallons per minute. The labor required to attend to the actual washery consists of one man and one boy, two men being needed for the loading of the washed products.

Two different seams of coal are normally washed in this plant, the mixture of which is extremely variable. Sometimes (owing to temporary stoppage of one or the other of the shafts) the washery has to treat either one separately. The characteristics of washability of the two coals, however, are entirely different, the Kilburn coal, for example, containing twice as much dirt as the Low Main, and the pure coal of the former seam having a greater specific gravity than that of the latter.

In spite of the difficulties enumerated, the percentage of free coal contained in the shale varies between 0.9 and 1.7 per cent only and the total ash in the washed product has generally not exceeded 2 per cent above the fixed ash of the coal, although the sludge has been continuously mixed with the fine washed product.

One of the most striking properties of the plant is its capacity for reducing the percentage of pyritic sulphur. The total sulphur in the raw material is approximately 1.6 per cent, whereas in the washed product it is reduced to 1.11 per cent.

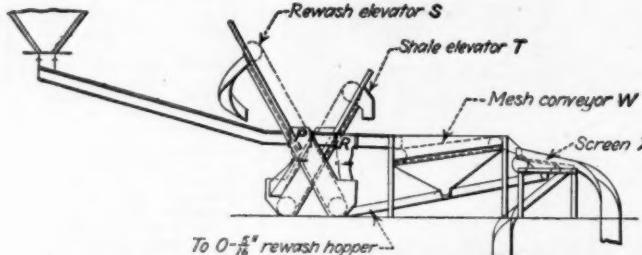


Fig. 6—How the Coarse Coal Is Washed

Only two traps are provided and neither have any ascending water. They take off rewash and slate respectively. The rewash goes back to the head of the trough and is put through the process a second time. The screen sends any undersize that may be formed back to the fine-coal washer. Some also goes through the mesh conveyor and joins the coal from the screen.

The Miner's Torch

Overrating the Value of Education

During the last few months of 1923 most all of the weekly and monthly literary magazines and especially the ones appealing to women, had articles marshalling support to Senator McCormack's proposed amendment to the Constitution designed to give Congress power to regulate Child Labor in the United States.

In most States children are already prohibited from working in mines until they pass the age of sixteen so the amendment in question would have little effect on the employment of children in mines, consequently mining men have paid little attention to the pending bill, but the magazines mentioned reach a large number of homes in mining communities and the possible effect of the magazine articles is worth considering.

Every article on the subject of Child Labor that I have seen starts off something after this manner: "It is no longer possible to suggest argument against the prohibiting of child labor; every objection that can be advanced has long since been proven absurd. Only two plausible reasons for allowing children to toil have ever been suggested. First: Labor is good for children. Second: Some communities need the earnings of the children. The rebuttal to the first is found in the records of our juvenile courts and to the second in banking statistics."

I am in no position to question the records of the juvenile courts and when it comes to banking statistics I am still more helpless, so of my own knowledge I cannot question the arguments put up by the opponents of child labor but of my own knowledge I can say that many of the parents who have been led to believe that education is a broad highway to success for all children may find that they have been misled.

The most pathetic figure that you can find around a mining camp is a hard-working foreman who has come up from the ranks and made a success, in spite of early handicaps due to poverty and lack of education, trying to place a son who has just finished college but who has never been allowed to labor with his hands because he was destined by his father to become an educated man that he might be spared the struggle of his father.

If we can accept the testimony of the men who have made the most conspicuous success of recent years even in the so-called learned professions, at least 75 per cent of the work which they perform consists of wearisome routine and in their capacity for hard work in spite of all of the drudgery we find the secret for all of their accomplishments. What chance then have the sons of self-made men to gain recognition in any profession when they have been led by their fathers to believe that their education will allow them to escape all of the drudgery.

Granting that the ability to apply one's self to hard tasks is at least as important as education, is it exactly fair to allow our homes to be flooded with articles which lead ignorant parents to believe that their sole responsibility to children consists in keeping them in school?

Just a word of caution. If you believe that I am opposed to educating the young, please read again what I have written and be assured that I have not said so.

Lethbridge Coal Field Developing Rapidly

Seam Has Eight per Cent of Moisture and Though It Contains Only Four and One Half Feet of Clean Coal, Its Good Roof, Level Floor and Freedom from Water Make Mining Easy

BY JOHN H. TURNER
Lethbridge, Alta., Canada

LEATHBRIDGE is the oldest coal-mining region in the province of Alberta, coal having been mined in that district for more than forty years. The Geological Survey of Canada (1914) is authority for the statement that coal was probably mined at Coal Banks (Lethbridge), Belly River, in 1874, the output being hauled by team to the barracks at Macleod. At that time the coal was excavated from the banks of the river; but, later, a company was formed and a plant erected, which caused the industry to assume greater importance. In 1886, prior to the advent of the railroad, coal was shipped down the river in scows.

According to Dr. Dawson, the coal measures in the Lethbridge district contain several associated seams, only one of which is of sufficient thickness to be worked. That seam was first mined in the banks of the river, the operation being known as the "Sheran mine." Subsequently, the Northwestern Coal Co. operated the same seam on the opposite bank of the river. For the sake of distinction, this will be called the main seam.

During the summer of 1882 the Sheran mine started a small level or drift. Both that mine and the Northwestern Coal Co.'s operation were located in Section 36, Twp. 8, Rg. 22, west of the fourth principal meridian, which is that indicated at the bottom of the accompanying map of the district. Since that time, from twenty-six to thirty mines have been opened in the area covered by the map.

SIX MINES PRODUCE MOST OF LETHBRIDGE OUTPUT

At the present time, twenty mines are being operated in this district, the more important being the following: Galt mine No. 3, capacity 800 tons a day; Galt mine No. 6, capacity 1,600 tons per day, both these mines being operated by the Canadian-Pacific Ry.; Federal mine with a capacity of about 150 tons per day, operated by the C. S. Donaldson Coal Co.; Coalhurst mine, capacity 1,200 tons per day, operated by the North American Collieries, Ltd.; Chinook mine, capacity about 400 tons per day, operated by the Chinook Coal Co. and Lethbridge Coal Co.'s mine with a capacity of from 150 to 200 tons per day. The other fourteen mines are operated at different points on the outcrop along the river bank and streams, but they supply local trade only.

The topography of the district is that of a gently rolling prairie, having an elevation ranging from 3,000 to 3,250 ft. above sea level. The soil is a rich loamy clay, and water is very scarce. As appears in the map, this prairie is cut through by the Old Man River, which is 300 ft. below the prairie level. The river has many branches, some of which extend miles back into the prairie. The river itself at times attains a width of over a mile.

The coal is found at the base of the "Pierre shales," in what is known as the "Belly River" formation. The following table is a typical section of the strata overlying the coal, which may be summed up briefly as

boulder clay, 128 ft.; a glacial deposit of stratified material, 123 ft.; Pierre shales, 305 ft., beneath which are thin coal seams and shales overlying the main seam of coal. This main seam has an average thickness of 6 ft., but contains only 4½ ft. of good, clean coal.

A small quantity of water was struck in the moist river sand, at a depth of 190 ft., and again in the shales between 442 ft. and 480 ft. in depth. Little water is encountered in mining operations throughout the district.

In Table 2 is given the analyses of coal made recently by the Scientific & Industrial Research Council of the Province of Alberta, as given in its Report No. 5, 1922. The samples of coal analyzed were taken from five of the largest mines in the district. It is noteworthy that the results of these analyses show the coal to be superior to that of other lignite coals now being mined in Alberta.

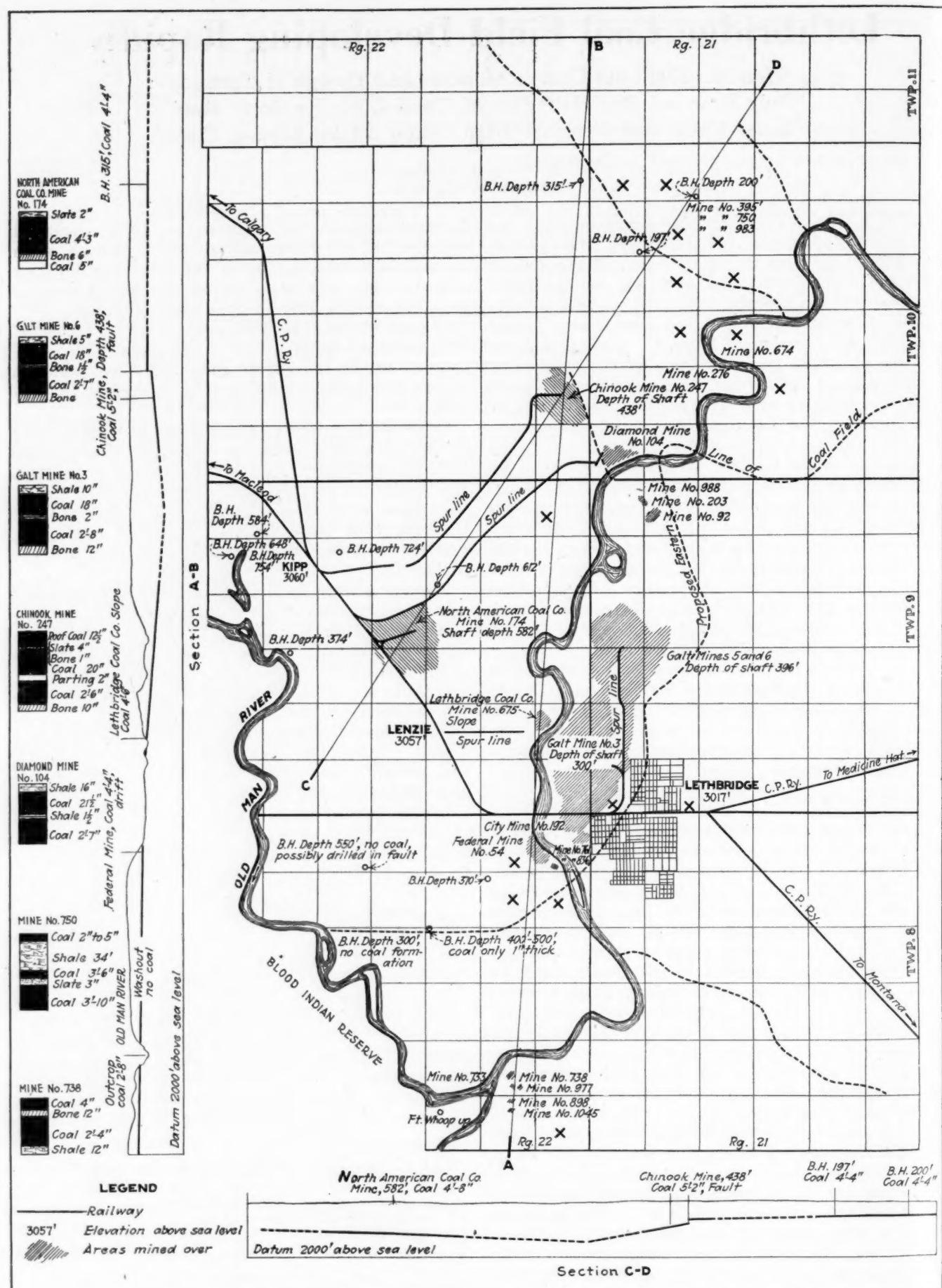
Though slightly undulating, this main seam has a general average dip of from 1 to 2 per cent in a direction varying from N 8 deg. W, to N 27 deg. W, according to the locality. In the southern and western part of the field the undulations conform to the average dip. The thickness of the seam decreases toward the southern and eastern boundaries of the field.

From present indications, it appears that there is a trough or valley that commences at or near the Southeast corner of Sec. 30, Twp. 9, Rg. 21, and extends approximately in the direction N 27 deg. W. It is possible that further exploitations to the North and west of the field may develop a basin in that portion. As indicated on the map by a dotted line, a well defined fault of 80 or 100 ft. lies between the Chinook and Diamond mines. This fault first was located in the former workings. The development there shows the seam to be dipping from 1.5 to 7.5 per cent, in a direction S 60 deg. W, along the northeastern edge of the trough or basin previously mentioned.

It is thought that a greater thickness of coal may develop in the lower levels approaching the center of the trough. An interesting feature of this seam is the generally uniform bearing of the cleats, in all the mines operating in the area shown on the map, as well as in mines to the north, east and south of this area. This bearing varies from S 61 deg. W to S 64 deg. W.

Table I—Section of Strata at Lethbridge, Alta., Canada

	Ft.	In.
Surface drift and boulder clay.....	128	0
White sandy clay with layers of gravel.....	30	0
Very fine loose sand.....	14	0
Gravel and boulders.....	18	0
Moist river sand.....	25	0
Gumbo.....	10	0
Gravel.....	26	0
Shales.....	305	0
Coal.....	0	8
Shales.....	2	2
Coal.....	0	10
Shales.....	20	0
Main coal seam.....	6	0



Principal Part of Lethbridge Coal Field, Alberta, Canada

Though the coal is lignitic it is of relatively high quality. As the field lies to the east of the Rocky Mountains and is level and almost untroubled, which cannot be said of the mines in the country to the West, the Lethbridge field has a distinct place in the geologic economy of the Province of Alberta.

There are many outcroppings of this seam, which I have indicated on the map by crosses.

The map covers only a portion of the whole area constituting the Lethbridge coal field, which embraces in all an area of 156,500 acres. Of this area, 108,000 acres contain merchantable lignite coal of superior quality. At present, little more than 3,000 acres, or 2.8 per cent, of this area has been developed in the forty years of coal-mining operations. In 1886 when, as already stated, coal first was shipped by scows from the Lethbridge field, the total output from the Province of Alberta was only 43,200 tons of coal, which increased to 1,246,360 tons, in 1916; and 5,976,432 tons, in 1922; and one-tenth of this total output then came from the Lethbridge field.

The report of the Mines Branch of the Province of Alberta, 1919, states that "over 100,000,000 tons of coal have been opened by mining operations, of which only 47,628,498 tons have been actually extracted; the remainder 26,628,770 tons have been lost beyond chance of recovery." The loss of coal mentioned in this report is a serious matter and worthy of the gravest consideration on the part of all concerned. Not only is it a waste of the nation's resources; but it is, also, a source of serious pecuniary loss to the mining industry of the province and is responsible, to a large degree, for the present high cost of coal.

Speaking from the standpoint of the coal operator, loss in extraction means a decrease in the value of assets. To open and mine a given area requires a certain expenditure for development and equipment. This determines the cost of these items per ton of coal mined. If half the coal is lost beyond recovery, it is evident that the return on the capital invested will be reduced 50 per cent. Incidentally, the overhead charges will be proportionately increased and the expense of haulage, drainage and ventilation per ton of coal mined will exceed the normal cost. So down the whole line of expenditure there is an increase in cost, while the income that should be available is reduced, which proves the necessity of enforcing economies in the system of mining with a view of producing cheaper coal.

ADVANTAGES POSSESSED BY LETHBRIDGE FIELD

The Lethbridge field is possessed of several advantages which reduce the cost of mining. Little or no water is encountered in sinking and in the development of the underground workings. Little or no gas is present and practically all the small mines use open lights. One of the large mines in operation for many years, still adheres to the open-flame lamps, others of the larger mines are equipped with electric cap lamps or flame safety lamps. The conditions of roof and floor are fair, which means economy in timber and the cost of upkeep of roads and air-courses.

In general, the mines of the district are worked by some form of the room-and-pillar system. Though on several occasions, modified longwall has been tried without success, it does not follow that longwall is unsuited to the mining of this coal. Eventually, some form of longwall may be found that will be better adapted to the conditions in the district than any yet tried.

Main roads are driven on the face of the coal, two, three and four abreast, at distances of 1,100 or 2,200 ft. apart. From these face entries, butt headings are driven in pairs, 400 or 500 ft. apart. The butt headings are driven to the right and left of the main entries and rooms, from 12 to 30 ft. wide, are turned off each

Table II—Analyses of Coal at Lethbridge, Alta., Canada

Name of Mine	Galt No. 3 Per cent	Galt No. 6 Per cent	Lethbridge Coal Co. Per cent	No. th American Coal Co. Per cent	Chinook Coal Co. Per cent
Loss in air drying.....	2.0	1.6	1.4	1.7	1.7
Analysis of Air-Dried Coal					
Moisture.....	8.2	8.4	8.5	8.5	8.9
Ash.....	9.1	10.3	10.0	9.9	11.4
Volatile Matter.....	33.4	32.9	33.3	32.4	33.0
Fixed carbon.....	48.8	47.9	47.7	48.7	46.2
Sulphur.....	0.5	0.5	0.5	0.5	0.5
	100.0	100.0	100.0	100.0	100.0
B.t.u., gross.....	11,140	10,900	10,950	10,900	10,590
Fuel ratio.....	1.45	1.45	1.40	1.50	1.45

pair of butts and driven to meet similar rooms driven from the adjacent butts. The width of rooms and room pillars will vary considerably, the distance, c. to c. ranging from 35 to 46 ft. As quickly as rooms are completed, the room pillars are drawn back, the entry pillars and stumps being removed as each pair of butts is finished.

Compressed-air punching machines are used for undercutting the coal. In some cases, the coal is sheared in the center, with the result that a larger percentage of lump coal and less fine coal and slack is produced. Permitted explosives are employed for shooting the coal. In the smaller mines, horses are used to haul the coal from the face to the shaft bottom. In the more extended workings, horses are used only to gather the coal, which is hauled out of the mine by an endless rope.

HOW SILICA AIDS TUBERCULOSIS.—Dr. W. E. Guy and Dr. W. J. Purdy have been engaged at the National Institute for Medical Research, Hampstead, Eng., in the study of the poisonous properties of colloidal silica, hitherto believed to be harmless. With Dr. E. H. Kettle Dr. Guy has completed and published studies of the effects of silica dust upon the tissues with special regard to the problems of industrial tuberculosis. These inquirers have made a thorough investigation of the experimental basis of the treatment of tuberculosis with soluble silica, which some have recommended. They have found says the *Colliery Guardian* that colloidal silica fed to or injected intravenously into susceptible animals has no influence on the progress of tuberculosis; the only effect it has is to localize the infection where the lesion caused by silica—soluble or insoluble—is such as to provide a *nidus* in which the tubercle bacilli, protected from the bactericidal defenses, possessed by the normal tissues, can initiate progressive damage. Thus a small dose of bacilli given with silica becomes in effect a large one, and the infection becomes firmly established.

TRAPPING FLAT PIECES OF SLATE.—Screens and rollers have been installed in Great Britain with corrugated surfaces. These set flat pieces of material on edge, thus allowing them to pass through holes edgewise, the rounder pieces passing over the top of the corrugations or on the top edge of the rolls. This effects a separation of shaly material from the rounder coal. The separation was not complete so far as the shale and small coal was concerned, but it insured the larger coal being practically free from loose shale and the extracted mixture containing a large percentage of rock could be dealt with by other means.—Cecil Bentham at the meeting of the Manchester Association of Engineers.

Deputy Chief Walker Describes British Mine Laws, Emphasizing Points of Difference

Firebosses Inspect Places for Gas Three Times Daily—Timbering Methods Prescribed by Division Inspectors—Inspect Mines by Sample—More Dangerous Mines More Frequently Visited—Thorough Wetting Costlier than Rock Dusting

QUALITY of air rather than quantity, regulation of timbering by the inspectorate, and instruction of mining novices by experienced men are three important features in the British mining law which Henry Walker, deputy chief mine inspector, Great Britain, described on the evening of March 4 in an address on "Engineering and Safety Problems of the Coal Mining Industry of Great Britain," at a joint meeting of the civil section of the Engineers' Society of Western Pennsylvania, the Pittsburgh section of the American Institute of Mining and Metallurgical Engineers and the Coal Mining Institute of America.

Mr. Walker described those details of regulation in the Coal Mines Act of 1911 which differ most from those in force in the United States. A fireman (fireboss) must examine all places in his district before his men go to work. Twice during the shift, in the morning and afternoon, he must make a like examination. Mr. Walker believes more firemen should be employed and the mines divided into smaller districts. By such means, he believes many accidents will be prevented, especially those resulting from roof falls.

Col. Edward O'Toole, general superintendent of the U. S. Coal & Coke Co., has a similar point of view. His success in reducing accidents by dividing a mine into small districts under the supervision of assistant mine foremen was detailed by Howard N. Eavenson at a meeting later in the week.

MUST WORK TWO YEARS UNDER EXPERIENCED MAN

In England unskilled workmen must work for at least two years under the direction of skilled miners, at the end of which time they are rated as "experienced" men. No skilled miner is allowed to supervise the work of more than one novice.

"Half of our accidents are caused by falls of roof," Mr. Walker remarked. "Consequently, all working places are required to be adequately supported by rows of posts or chocks. The intervals at which these are spaced usually are specified by the division inspector. As a rule, the intervals are less than those allowed in the United States. The row of supporting timber must be placed no less than 4 ft. from the face."

An "agent," one who represents a coal company and is superior to a mine manager, must have the same qualifications as the latter, if he has any authority as to the manner in which the mine is conducted. That is, he must hold a first-class certificate. While this might work a hardship on a number of our higher coal-company officials, such an act in this country would prevent not a few mine disasters.

Mr. Walker said that in Great Britain the mine ventilation must be adequate to give the right "quality" of air regardless of volume. S. A. Taylor reviewed the origin of those provisions of the mining law of Pennsylvania relating to the quantity of air required for ventilation. At that time, it was held that the

average man breathed 9 cu.ft. of air per minute. A margin of safety was established by requiring enough air to be pumped into non-gaseous mines to furnish 100 cu.ft. of air per minute to each man, and in gaseous mines, twice that amount. In late years this margin has been increased.

Mr. Taylor said he believed that quality should come before quantity, contending that air at a high velocity stirs up coal dust, increasing the risk of an explosion from this source. George S. Rice, of the U. S. Bureau of Mines, said that lessees of government-owned coal lands in the west must comply with a federal law specifying "quality" in ventilation.

The discussion then turned to the regulation of hoisting equipment. Prof. Fred Crabtree asked if hoisting equipment was examined every week. Mr. Walker said that it is examined daily. That the English law is one-sided in this regard was revealed in the answer given Graham Bright's interrogation as to what precautions are taken to control a hoist, should its operator suddenly become incapacitated. Regulation covers only precautionary overwinding equipment. Safety catches are not used to stop a cage in the event the rope breaks. Prevention of accidents from this source is dependent upon rope inspection.

WILL COLLABORATE IN SAFETY INQUIRIES

A spirited mine-safety conference was held all day, March 6, in the assembly room of the Pittsburgh station of the U. S. Bureau of Mines. A. C. Fieldner presided. Dr. H. Foster Bain, Director of the Bureau of Mines, outlined the purpose of the British representatives in coming to this country: To promote the proposed international co-operative research into safety in mining which they themselves had proposed. Dr. Bain hopes that each country will manage to send representative research men to the other's experimental stations to form a close contact in the work planned by the two organizations.

"The Mines Inspection Department of Great Britain" was the subject of a talk by Henry Walker dealing with the organization and duties of the department of which he is the head. Inspections of mines are made without notice. Contrary to the American practice, an English inspector is not required to examine all parts of a mine. Usually he visits one section and takes its condition as a criterion of that of the entire mine. If suggested corrections are not made between visits of an inspector, the Mines Inspection Department may delegate two inspectors to make a joint inspection of every working place in the mine.

Failing to observe the recommendations made after the joint inspection, a mine manager is liable to prosecution. This action, however, is seldom taken. In case of difficulty in his problem, the mine manager takes the inspector into his confidence and seldom tries to hide trouble. In turn, the mine inspector co-operates

with him to remedy faults and does not resort to the alternative of prosecution.

In order of rank, the staff of the Mines Inspection Department consists of a chief or deputy (Mr. Walker) and division senior, junior and sub-inspectors. A division inspector has duties and responsibilities on the plane with those of our state mine inspectors, and he may be provided with one or two clerks and an office. Vacancies made by the promotion, retirement or death of division inspectors are filled by competitive civil-service examinations.

Promotion is made on merit and not on seniority. A retiring inspector receives a pension equal to one-sixtieth part of his yearly salary for every year he has served, or he may accept a lump sum equal to a year's salary plus one-eightieth of that earned for every year in service. He may retire with pension at 60 and he must retire on reaching his sixty-fifth year. Salaries are low, and allowances for expenses in traveling are less than actual expenditures.

Miners have the prerogative of appointing two fellow workmen to inspect the mine in which they are employed. Miner inspectors may be delegated to make only one examination of the mine or they may be appointed for a term. In either case, the workman must pay the wages of his representative inspectors. At the end of each day these men must file a report with the management. The managers must submit any unfavorable report to the division inspector. The system gives the miners confidence in the safety of the mine in which they work. J. W. Paul inquired as to the extent of labor turnover in British mines. Mr. Walker said that it was very small. The miners are little disposed to wander from mine to mine.

MINES EXAMINED BY SAMPLE AND WHEN NEEDED

Mines are not inspected on any regular schedule. Those in which dangerous conditions are found are examined more frequently than others. In answer to a question by George S. Rice, Mr. Walker said that the inspector's report was not posted at the mine. "No one," said Mr. Walker, "outside of the inspection department had a right to see this report." When asked his opinion as to the policy of posting reports as is customary in the United States, he replied, "The posting of a report publicly proclaims the inspector's rating of the conditions of the mine at the time of his examination, and may not be a correct statement of the conditions existing ten minutes or ten days later." He does not favor the practice of posting reports. An inspector should not be held responsible for accidents occurring in a mine soon after it is examined, and certainly not at a later period. It was argued, however, that the posting of an inspector's report inspired the miners with confidence.

"Research on Mine Explosion Prevention with Special Reference to Stone Dusting" was the subject of a talk by Dr. R. V. Wheeler, Director of the Department of Mines of Great Britain. In that country, researches are being made to discover something more effective than stone dusting in preventing dust explosions. Coal dust presents a peculiar problem because a small fraction of the quantity usually distributed on the roof, ribs and floor of the mine is sufficient to propagate flame. The rôle of inflammable material in diluting coal dust is parallel to that which ventilation plays in diluting firedamp. Though Great Britain is still studying the action of coal dust under various conditions and



Administration Building, Carnegie Institute of Technology, Pittsburgh

The Carnegie Institute welcomed the delegates from England to its auditorium. The Institute recognizes that it can afford no greater service to the industry than to promote aggressively the campaign for safety in mining. The mine operators and managers are looking askance at the frequency of big explosions and wondering if their fate, misfortune or destiny it is to be the next victim.

is hunting industriously for a substitute, it has decided to rely upon the ability of rock dust to prevent explosions until a better means has been found. Dr. Wheeler is particularly anxious to drive home this purpose, as is evidenced by the fact that he repeated it several times in his series of talks in Pittsburgh.

Included in the study of the ignition of coal dust, three problems have received much attention: (1) The character of coal dust; (2) the character of the mine atmosphere, and (3) the character of the source of ignition. The last problem involves studies of sources of ignition both of short and long duration.

In studying problems relating to the propagation of coal dust explosions, four major factors are given careful consideration. These are: (1) the maximum degree of violence such an explosion can acquire; (2) the effect of restrictions in a roadway (causing turbulence and increasing violence); (3) the effect of air currents on the characteristics of an explosion; (4) the effect of the position of the source of ignition. These are being studied in the attempt to find something to supersede rock dusting, and are not being made because any doubt exists as to the value of following that practice at the present time.

LIGHT-COLORED DUST CONSERVES ILLUMINATION

George S. Rice and Edward Steidle spoke on "Rock Dusting or Stone Dusting as Applicable to American Mining Conditions." Mr. Rice reviewed British methods prior to 1920 when the official law relating to rock dusting was inaugurated and then turned his attention to the practices in the United States. Light-colored rock dust should be used, not only because it aids in underground illumination but also because it enables one to judge with surprising accuracy its percentage in a mixture with coal dust.

The shortcomings of water as an agent to make coal dust harmless compel us to look for a substitute. None better than rock dusting is known. At present only two or three companies in the United States are using this system, but sooner or later the practice must become national. Mr. Rice did not infer protection by rock-dust barriers but by the English method of general distribution of rock dust throughout the mine. The coal-dust hazard, he added, is more serious in this country than in England.

There, practically 90 per cent of mining is longwall

and few of the coal seams are developed by entries, thus avoiding the explosion hazards of narrow places. In this country the thickness of exposed coal is in most cases equal to the height of the entries. The spalling of exposed coal, the absence of rock spillings, the building up of coal in the sides of mine cars and the rapidity of haulage combine to intensify the hazard of coal dust as compared with that in England. Mr. Rice frankly admitted that he has no confidence in any method of watering or humidification, because explosions had occurred in mines which took pains to be thorough in the use of water or steam. He is inclined to believe that rock dusting is cheaper than any system of wetting or humidification that rightly may be termed thorough.

ROCK DUSTING SHOULD BRING LOWER INSURANCE

Captain Steidle took the operator's viewpoint in the matter. If rock dusting is cheaper than present practices with a like purpose, then it should be adopted without hesitation. New operations should be protected by it from the start. Compensation insurance ratings ought to be reduced for those mines which use rock dust. "Solid" mine cars and rotary dumps eliminate much of the dust on roadways.

The morning program wound up with a general discussion, started by Dean Holbrook who was interested in the milling and screening of rock dust. Mr. Rice explained that the Griffin roller mills are used more generally in Great Britain than grinding machines of any other type. The hammer-head type is better in the opinion of Dr. Wheeler. He urged that care be taken to detect the wearing of the screens, which, when it occurred, prevented accurate sizing. Centrally located mills on a joint ownership basis will probably be established in the United States. The most important questions for consideration, according to J. T. Ryan, are what materials should be used and how fine they should be ground. The arrangements for grinding are of secondary consideration.

CARBONACEOUS SHALE SHOULD NOT BE USED

Mr. Rice added that shales containing much carbonaceous material should not be used for two reasons: (1) Because the quantity required will be greatly in excess of the quantity needed where carbon-free shale is used, and (2) because the carbonaceous shale does not reflect light as effectively as pure shale or limestone.

Richard Maize asked if water will be used in connection with rock dusting. Mr. Rice replied that it should continue in use, for thereby the air currents will be prevented from carrying coal dust. In Alabama a number of cutting machines are equipped with spraying devices. S. E. Reynolds believes most explosions would not occur if coal dust did not spread. In response to a question by Mr. Maize, Mr. Rice said that though the hand method is probably best, the high labor cost of that method of distribution would inevitably lead to the use of machinery in its stead.

When R. Z. Price asked where rock dust should be spread, Dr. Wheeler suggested that it be placed wherever coal dust occurs. It should be mixed with coal dust in rooms and extended to the face.

The Inland Collieries Co. is beginning to use rock dust in its Indianola mine. T. G. Frear, general manager of the company, related in a few words the steps he is taking. Shale dust injected into entries displaces coal dust on the roof and ribs. A period of four hours

is required for the dust to settle. Some of the dust traveled half a mile. Earlier in the discussion Dr. Wheeler said he attached little importance to the portability of rock dust in air currents.

In next week's issue of *Coal Age* the discussions of the Mine Safety Conference will be concluded by an account of the afternoon session.

Moments of Unusual Danger from Falls

MINING men in America have thought that they noted that at a certain period of the night the danger of falls increased. Unfortunately no one in the United States appears to have made any effort to sustain that belief from reasoning or definite observation. Men are not working in equal numbers night and day, and so statistics of accidents from falls are not evidence of the hazard. In fact, the accident record would tend to prove the night the less hazardous if we did not know that at that time few persons are exposed to the risk.

D. W. Rees in an article in the *Colliery Guardian*, Vol. CXXV., p. 331, recently regretted that more attention had not been given to this subject, seeing that falls in the aggregate killed and maimed more men than explosions. He explains that the earth tilts on an average twice a day and in winter sometimes more often. That tilting is only about one-thirtieth of a second of arc but this, though intrinsically small, corresponds to a vertical movement of the strata of about 60 ft. The figure given is often exceeded, however. One or two hours after midday or midnight is the most likely time to observe this effect.

Mr. Rees declares that miners know as a matter of tradition that a visible and audible effect is produced at these times and that falls which are on the point of occurring are most likely to take place during those periods. He says that fine matter drops from the roof at these intervals, showing that a slight movement of the strata as a whole is taking place, a grinding noise is heard as the roof settles on the packs, and the mine seems to be moving in every part. The greatest effect over a period is produced in March and September, but weighting should proceed at a more rapid rate in winter than in summer.

The author shows a chart showing the relation between the number of unassisted falls and the time of occurrence averaging over the period of one year in a seam with a weak roof. From this can be gathered that an average of fourteen and a half occurred at about 2:30 a.m. and six about 2 p.m. These periods were the two maxima. The night maximum, though higher than the day maximum, is of a duration not in accord with its intensity.

At midnight, about 0.5 falls occurred; at 2 a.m., about nine; at 2:30 a.m., as stated, about fourteen and one half; at 3 a.m., about twelve; at 4 a.m., about six; at 6 a.m., only three; at 8 a.m., less than two; at 10 a.m., a little less than one. Then starts the day maximum. At noon there are two and at 2 p.m. there are, as stated, six; at 3 p.m., about five and a half; at 4 p.m., only three, and thereafter till midnight, never more than one and a half nor less than one half. The author does not state the length of time taken as the basis for these figures, whether a day, a week or a month, nor the size of the mine. He only states that they are averages for one year.

Determining by Volumetric Tests the Quantity of Unmarketable Material in a Coal Seam

Displacement Tank Used to Obtain Volume of the Various Sizes of Coal Shipped—Volume of Coal in Solid Calculated from Mine Maps and Compared with Volume Shipped to Market

BY HAYDN OWENS

APRACTICAL example of how the mining engineer devises schemes for assisting him in his work occurred when the problem of determining the proportion of waste coal in a certain mine area presented itself to our department. The mine maps were first carefully measured by means of a planimeter, and by applying the thickness and pitch factors, the total number of cubic feet of coal removed from the section was determined. The total tonnages of the various sizes of coal mined and shipped from the area were next obtained, and by means about to be described, their volumes were ascertained. Obviously, the volume of the waste or unmarketed coal must be equal to the difference between the volume of coal originally in the section and the volume of the coal mined and shipped.

DISPLACEMENT TEST MADE OF PRODUCT IN BULK

The real problem in the investigation was the determination of the volume of the coal which had been marketed. Knowing the tonnages of the various sizes of coal shipped and by combining with it the academic principle of water displacement the solution became quite simple.

When a solid body is immersed in water, the volume of water displaced is equal to the volume of the body itself, and by the application of this basic principle we found a means for determining the volume of the coal which had been shipped to market.

The water displacement test was made in a tank which consisted of two uncovered compartments connected by a pipe. If the time consumed in making the test covers an extended period and the material tested is heavy the tank should be lined with sheet iron or constructed of concrete, thereby preventing the interior from becoming worn, and thus enlarged. Should this wear occur, the accuracy of the test would be destroyed. If the material to be tested is not heavy and not liable to injure the sides or bottom of the tank, it may be constructed of wood. In this event well seasoned red cedar, cypress or white pine should be selected. The surface of the wood should be well shellacked and painted, and all joints should be carefully calked to prevent losses by absorption and leakage.

The accompanying illustrations show a well-constructed wooden tank suitable for testing light materials. It is made with a displacement compartment A, the bottom of which is lined with sheet iron. A measuring compartment B connected by a pipe C and holes at D and E for draining off the water. Each compartment is 3 ft. square, the water flowing from the displacement compartment to the measuring compartment at a point 4 ft. above the bottom of the tank. Therefore, each compartment will hold 36 cu.ft. of water.

To explain the method of conducting a test we will

assume that we desire to determine the volume of a known weight of chestnut coal. After inserting the plugs at C and D (Fig. 1) the displacement compartment A is filled slightly above C. When the plug at C is drawn, the water drops to the lowest level of the pipe, to wit, 4 ft. above the bottom of the compartment. After the excess water has passed to the measuring compartment and out at E, the plug at E is inserted and the tank is ready for the test.

Fig. 2 shows a 1,000-lb. sample of chestnut coal which has been dumped into the displacement compartment, its equivalent volume of water having passed into the measuring tank. It is now necessary to determine the volume of the water thus displaced. The depth of the water is measured and found to be 1.18 ft., and the bottom of the tank being 3 ft. square the volume of the water must be 10.62 cu.ft.; therefore 1,000 lb., the weight of the coal, divided by 10.62 gives the weight per cubic foot of the chestnut coal as 94.16 lb. in the solid.

STEEL TAPE BETTER THAN ROD FOR MEASURING

Care should be taken in establishing the depth of the water in the measuring tank, because capillary attraction will cause the water to rise up the sides of any measuring rod that is inserted in it. A good device for this purpose is a steel tape with a plumb bob suspended from a board F to the surface of the water, the depth of water being determined by the difference between the distances of the board F from the bottom of the tank and from the point of the plummet respectively. To aid the eye in discerning when the plumb-bob point reaches the surface of the water a small quantity of fine dust may be sprinkled over the surface.

To the total tonnages of the various sizes of coal shipped was applied the weight per cubic foot of the respective sizes. This gave the solid content of the coal

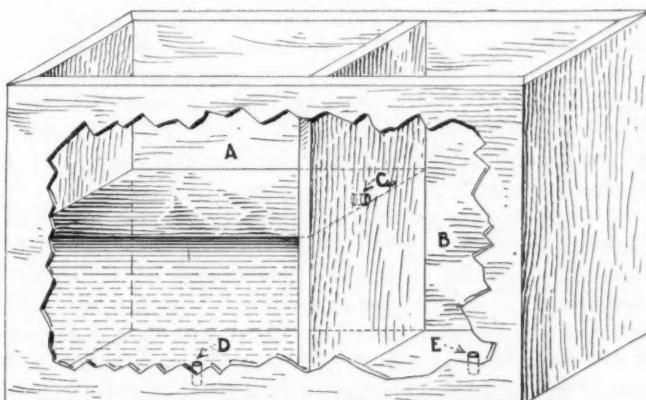


Fig. 1—Isometric View of Displacement Tank

Compartment A is first filled so as to overflow through pipe C into compartment B. This establishes the proper level in A making the tank ready for the test.

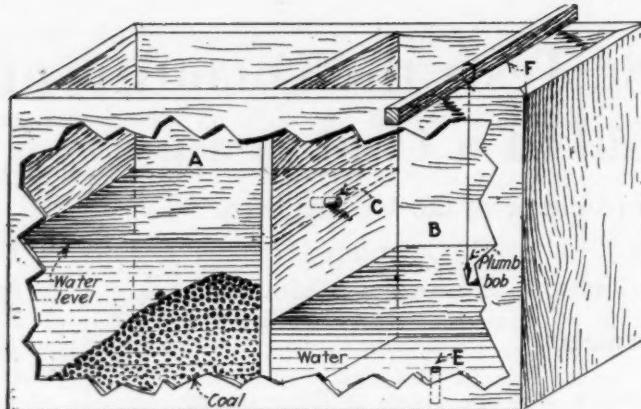


Fig. 2—Making a Volumetric Test of Coal

The coal in compartment A has displaced a quantity of water equal to its volume. The level of the water in compartment B is measured by means of a plumb bob and measuring tape. The height of the water in the tank is equal to the depth of the tank minus the distance measured by the tape as shown.

removed. The difference between the volume of the original coal area in the mine and the volume of the coal shipped gave the volume of the waste.

In Its Coal Era, South Wales Was Folded, Like Pennsylvania, in Two Directions

By R. DAWSON HALL
Engineering Editor, *Coal Age*

BROADLY speaking, the history of folding movements during the laying down of the Carboniferous measures in Pennsylvania and South Wales has some points of similarity. In South Wales, anticlines and synclines in two different directions may be found. Some run northwest and southeast and some east and west. The latter in South Wales attain "considerable magnitude and at the present time" say Davies and Cox in a paper presented to the South Wales Institute of Engineers "determine the dominant features of the coal field." The two classes of folds appear to have been formed promiscuously, now one now the other. The forces causing one class of fold apparently ceased to act and the forces causing the other came into play only to be replaced later by thrusts accentuating the first folds or perhaps starting others in the same direction.

In Pennsylvania also there are flexures in two directions and it seems probably they alternated, or as Mr. Davies would say, they "oscillated." No expressive word seems available for the relative occurrence of these intermittent, interacting and irregular impulses. One series of Pennsylvania folds has a northeast and southwest trend instead of northwest and southeast as in South Wales. That series is the dominant geological feature. There is also a series running east and west. It is distinctly subordinate to the other and is certainly not the dominating series as is the east and west folding of South Wales.

In speaking about that principality Davies and Cox remark that the later movements might be expected to cause an apparent deflection in the axis of an earlier movement. It might also cause a local thickening to be superposed on a local thinning where to a synclinal axis would cross an earlier anticlinal axis or conversely a local thinning to be superposed on a local thickening due to a later anticline crossing an earlier syncline. However, they say that they are not prepared to state whether this thinning and thickening action is marked enough to be of commercial importance.

Another instance of the value of the displacement test occurred when it became necessary to estimate the capacity for water storage of a partially inundated quarry, conditions being such that it was not easy to survey the area owing to the difficulty of obtaining access to the excavation. In this case, to the record of loose shipments the data obtained from the displacement tests was applied converting the loose material removed into cubic content in the original solid and so the storage area was ascertained.

It would be possible to determine the specific gravity of solids by dividing the weights per cubic foot by the weight of a cubic foot of water. This, however, is not recommended, as only a sensitive balance should be used for this purpose, and the voids in a coal pipe are different for various sizes of coal.

In making a test of coal shipped to market in the manner just cited, the percentages of impurities carried by the coal should receive consideration. The coal should be graded either to conform to the trade allowances or to the averages of the percentages obtained in the tests made by the coal inspector.

By numerous measurements the authors have made maps showing where the intervals between coal beds are of equal thickness. These lines they term isopachytes. They found sometimes in the higher seams a little difficulty in correlating the beds. Therefore pending a more reliable correlation of the seams between the Two-Feet-Nine and Rhondda No. 2 seams it has been found advisable to utilize only certain of the more prominent seams such as the Two-Feet-Nine, Rhondda No. 3 and Rhondda No. 2. Thus in all seven isopachyte maps have been prepared, five of which show the variation in the thickness of the intervals of the strata between the following horizons: Rhondda No. 2, Rhondda No. 3, the Two-Feet-Nine, the Four-Feet, the Six-Feet and the Nine-Feet seams.

It would not serve the interests of the readers of *Coal Age* to go into the details of these variations in thickness of interval. It would seem better rather to point out that this study should be pursued with regard to the coal measures in the United States as much of value geologically would be discovered. There are evidences in plenty of east-and-west synclines in the Kittanning measures and of anticlines which run in the same direction. The buried rivers of the Kittanning period are also more or less of east-and-west trend. The coal in the Middle Kittanning is often found only in such synclines and it rapidly thins as the bottom of syncline is left.

In the Freeports, strange to say, the evidences as of these synclines and the thickening that goes with them is not evident, making it questionable whether the thrust north or south whichever it was continued into the period when the Freeport was laid down. Perhaps as in South Wales it did not persist. This inquiry into the South Wales field would furnish a suggestion for geologists, striving to trace the history of the deposition of our beds, to forecast the direction of the main buried valleys in the Freeport and Kittanning horizons and also to prognosticate the areas in both groups of beds likely to be found most productive of coal. The study may be easier later when the ground has been better proved but it certainly then will be less productive of valuable results, for when the coal is out the indications will have only academic value.

News Of the Industry

Central Pennsylvania Coal Miners Seek Best Scale Obtainable for Three Years

The convention of District No. 2 (central Pennsylvania), United Mine Workers, came to a close March 22, when it was agreed that the scale committee be authorized to obtain the "best agreement obtainable as to wages and working rules on the basis of no wage reductions and for a period of three years." It also was agreed that the salaries of district union officers be increased and that the *Penn Central News*, the official organ of the district union, be abolished. The convention lasted two weeks, and most of the sessions were stormy. Representatives of the miners and operators will meet to negotiate a wage agreement in Philadelphia this week.

The proposal to increase the salaries of district union officials was overwhelmingly defeated on the first vote. On reconsideration strong pressure was brought to bear on the delegates, it being set forth that living conditions and expenses have undergone such changes since the present wages were adjusted that it was no longer possible to make ends meet. When the vote was taken the second time it carried, 441 to 320. The salaries hereafter will be as follows: President, \$300 per month, an increase of \$75; vice president, \$275 per month, an increase of \$75; secretary-treasurer, \$300 per month, also an increase of \$75 per month. Board members will receive \$250 per month, an increase of \$56.

Strike Was Costly to Union

The scale fixed for checkweighmen was fixed as follows: From 25 to 200 miners, \$7.95; 201 miners and over, \$8.50. A resolution also was passed which provides that any member of the union found guilty of assisting any mine foreman to discriminate against an active member of the organization shall be fined \$100 for the first offense and for the second offense shall be expelled for two years and fined \$200.

The report of Secretary Richard Gilbert, which was accepted and ordered filed, shows that the strike in Somerset County, which terminated last August, cost the district, from April, 1922, to December, 1923, \$1,186,915.17.

A long list of resolutions was adopted, of which the following is a brief résumé: Favoring the creation of a permanent national fact-finding agency for the industry; endorsing the work done by President Brophy in forming a plan for public ownership and democratic management of mines; to have asthma classed as an occupational

disease; demanding that shotfirers in gaseous mines possess a state certificate and be able to read and speak English; to have the union employ physicians; that the district officers take out compensation for all local officers and delegates when they attend conventions, and requesting approval by the district officials of all national organizers and field workers sent into the district.

The report of the scale committee was adopted, after being fully explained by President Brophy, during which he declared that all grievances will be taken up at the conference with the operators in Philadelphia and that the union will go to the limit to improve working conditions. The report as adopted reads:

"We, your scale committee, recommend to the convention, in lieu of all resolutions relating to wages and working conditions that have been presented, that the scale committee of District No. 2 be authorized and instructed to secure the best agreement obtainable as to wages and working rules on the basis of no wage reductions and for a period of three years.

"The scale committee is authorized to take such action for the protection of our best interests as circumstances may require, and to advise the membership of unexpected developments that may arise and which cannot be foreseen."

The scale committee is composed of John Brophy, Richard Gilbert, James Mark, William Welsh, Patrick McDermott, Harry Crago, H. Elmer Johnson, F. V. McCloskey, Arthur Taylor, Leonard Cluois, Herman E. Varletto, George Mottey, Peter Ferrara, James H. McCarthy, William Ackley, John P. Nelson, Tony G. Badiale, D. P. Kirk, S. J. Hudunski and William Hoskins.

DuBois was selected as the meeting place for the next convention.

Heavy Union Majority for Jacksonville Agreement

The three-year wage agreement negotiated at Jacksonville last month for the Central Competitive Field will be accepted by an overwhelming majority, according to an announcement at headquarters of the United Mine Workers, Indianapolis. Several days more will be required before all the ballots have been returned and tabulated.

John L. Lewis, president of the miners' union, announced the international executive board would meet April 3 to consider routine matters.

Wyoming Signs Up

The United Mine Workers of America, District 22 (Wyoming), signed an agreement providing for a three-year extension of the existing wage contract without change as to rates or conditions, at Cheyenne, Wyo., March 19. The miners' union had about sixty delegates in session at Cheyenne from March 3 to 19 formulating demands for changes in rates and conditions regardless of the fact that their national organization at the Jacksonville convention and thereafter had approved a renewal of the existing contract without change for three years. The cost of the Cheyenne convention represented a heavy tax on the local unions.

11 Companies Join Coal Field Superpower Plan

Eleven electric-power companies controlling forty stations in five states, capable of developing 2,000,000 hp. and representing a capital of \$315,000,000, have joined in a co-operative distributing system to be known as the Coal Field Super Power Group, according to an announcement March 20 by H. Hobart Porter, president of the American Water Works & Electric Co. The group serves a population of nearly 8,000,000 people in the industrial center of the country embraced in Ohio, Pennsylvania, Maryland, Virginia and West Virginia.

Companies in the co-operative system include the Duquesne Light Co., Penn Public Service Corporation, Potomac Edison Co., American Gas & Electric Co., Cleveland Electric Illuminating Co., Ohio Public Service Co., Penn-Ohio Electric Co., Northern Ohio Traction & Light Co., Penn Central Light & Power Co., Keystone Power Corporation and West Penn Power Co.

Mr. Porter said the cost of electricity would be reduced by many millions annually and better service assured. Labor troubles also would be minimized, he said, for the coal miner would be provided steady work.

This particular superpower group is but one of many growing up in the country. The idea is taking hold in New England, New York, New Jersey, the South, the Middle West and on the Pacific Coast. The importance of the industries served in Ohio, Pennsylvania and Maryland has hastened the completion of plans there, but Mr. Porter stated it as his opinion that eventually all electric power in North America would be linked into one gigantic unit.

Settle Working Conditions but Not Wages at Baltimore

Operators of northern West Virginia and the United Mine Workers had agreed on working conditions but not on a wage scale when the conference at Baltimore adjourned Saturday, March 22, to reassemble Wednesday, March 26.

George C. Brackett, executive vice-president of the operators' association, however, expressed confidence that complete agreement would be reached between the miners and operators after going back home to talk it over.

"All changes agreed upon as to working conditions," Mr. Brackett said, "will tend to more efficient production of coal, better management of the mines and better understanding of the rules by both parties."

Coal Exporters Protest Low Rates on U. S. Ships

Exporters of coal have joined with shippers of certain other commodities in protesting against the action of the U. S. Shipping Board and the Interstate Commerce Commission, which will allow Sec. 28 of the Merchant Marine Act to become effective May 20. Under that act, the lower rates which are allowed on goods intended for export or on shipments being imported are to be applied only when the consignments are carried on ships flying the American flag.

Since the enactment of the Merchant Marine Act in 1920, the Shipping Board has not regarded the supply of American flag ships sufficiently adequate to justify the application of the provision. The Shipping Board is of the opinion, however, that "adequate shipping facilities now are available to handle the transportation of all commodities, other than grain, between ports of the United States and ports of Great Britain and northern Ireland and the Irish Free State, the ports of Continental Europe north of and including Bordeaux and the east coast of Asia, the islands of the Pacific Ocean, Australia and the East India islands and the ports of Central and South America."

Keeney Acquitted After Trial Lasting Five Weeks

C. F. Keeney, president of District No. 17, United Mine Workers, was acquitted March 15 after being on trial since Feb. 11 charged with having been an accessory before the fact to the murder of John Gore, a deputy sheriff of Logan County. The jury deliberated just an hour and a half before returning its verdict of not guilty.

In the closing hours of the trial it was apparent that the defense relied for acquittal on the evidence it had introduced to show that Keeney acted in good faith when he urged the miners in a speech at Madison to turn back, and that the state relied on the evidence it had introduced to show general



E. J. McVann

Attorney for the Fairmont operators in the Pittsburgh rate case, which will be reopened before the Interstate Commerce Commission April 22.

responsibility for the march as a means of obtaining a conviction.

It has not been definitely determined just which one of the defendants will be tried next. Charges still pending against Keeney include treason, of being accessory to the murder of John Cafalgo and two charges of insurrection. Several charges also are pending against Blizzard. Although Fred Mooney is under indictment with other union officials for alleged complicity in the armed march, he has never been brought to trial on any of the charges pending against him.

Deepwater Co. Buys More Alabama Coal Lands

Several hundred thousand acres of coal and iron lands have been acquired by the newly organized Deepwater Coal & Iron Co. in Cherokee, Marshall, DeKalb, Jackson, Fayette and Tuscaloosa counties in addition to the 500,000 acres already acquired in and near the Birmingham district by the company, according to an announcement by L. B. Musgrove, an official of the company.

This makes the company the second largest in the South in point of holdings and brings the total amount involved in the big enterprise to more than \$30,000,000, he asserted.

Engineers for the Robert W. Hunt Co., of Chicago, will prepare plans and specifications for the developments, mining, construction, building, engineering, etc. This Deepwater enterprise is a Delaware corporation, with an authorized capital of 10,000 shares of 7 per cent cumulative preferred stock of \$100 par value, and 200,000 shares of no par value common stock. L. B. Musgrove, of Jasper, is chairman of directors; Charles A. Meade, of New York, president; John M. Goetchius, Walter Douglas and Morris R. Poucher, of New York, vice-presidents; Charles T. Lark, of New York, secretary-treasurer and counsel.

To Study Operating Problems At Cincinnati Coal Show

A series of discussions of practical operating problems has been arranged in connection with the exposition of coal-mining equipment and machinery to be held by the Manufacturers' Division of the American Mining Congress at Cincinnati May 12 to 17. The coal symposium will last four days, beginning May 13; the program, which was arranged by Ralph C. Becker, Alphonse F. Brosky and H. F. Peck, follows:

"Problems of Mine Electrical Men," Graham Bright, chairman—(1) "Storage Batteries on Cutting Machines and Main-Line Locomotives," R. L. Kingsland; (2) "Advantages of Multiple-Speed Fan Motors," A. B. Kiser; (3) "Savings in Power and Maintenance by Better Voltage Regulation," Carl Lee; (4) "Economy of Equipment Standardization," J. H. Edwards; (5) "Inspection of Electrical Equipment," C. L. Harrod; (6) "Testing of Electrical Equipment," J. F. MacWilliams.

"Necessity for Rock Dusting," D. W. Buchanan, chairman—(1) "Occurrence, Characteristics and Behavior of Coal Dust," J. W. Paul; (2) "Actual Experiences with Rock Dusting," D. W. Buchanan; (3) "Tried Methods of Applying Rock Dust," John E. Jones; (4) "Methods of Procedure," John T. Ryan; (5) "Rock Dust vs. Water," Edward Steidle; (6) "Co-operation of U. S. Bureau of Mines," George S. Rice.

"Safety and More Lump Coal by Proper Use of Explosives," H. C. Adams, chairman—"Tests to Produce More Lump Coal," C. W. Nelson and J. E. Crawshaw.

"Correlation of Mechanical Loading with Haulage and Mining Systems," Howard N. Eavenson, chairman—(1) "Review of Progress," D. J. Carroll; (2) "Determining Factors in Application of Various Types," Raymond A. Walter; (3) "Preparation of Mechanically Loaded Coal," Thomas F. Downing, Jr.; (4) "Mechanical Loaders for Rapid Entry Driving," Carl Scholz; (5) "In Connection with Room-and-Pillar Mining," David Ingle; (6) "In Connection with Longwall Mining," R. Dawson Hall; (7) "Relative to Mine-Car Haulage," James Elwood Jones; (8) "Relative to Conveyor Haulage," Everett Drennen.

"Recent Developments in Equipment for Preparation of Coal," Col. Warren R. Roberts, chairman.

New York Dealers Discuss Burning Topics

Presided over by Roderick Stephens, vice-president of the Stephens Fuel Co., the New York City group of the New York State Coal Merchants' Association held a meeting at the Hotel Pennsylvania March 25. Some of the subjects discussed were the economical use of anthracite, new standards in the preparation of anthracite, and coal vs. oil, the latter by George Cushing.

At the banquet, in the evening, Michael Burns was toastmaster, and the speakers were Senator Harrison, of Mississippi, whose subject was "Freedom in Business," and Mgr. John L. Delford, on "Timely Topics."

Conversion of Coal Consumers to Storage Idea Proves Only Temporary

Backsliding Now in Evidence Indicates Off-Season Buying of Last Year Was Dictated by Circumstances Rather Than Vision—Early Slump in Purchasing Presages Trouble for Railroads

BY PAUL WOOTON

Washington Correspondent of *Coal Age*

Immediately on learning that the Jacksonville agreement had been signed, coal consumers apparently began to use their stocks. The production statistics and other information reaching the federal agencies concerned with coal indicate that the policy generally being followed is to curtail coal purchases or new commitments to make as large use as possible of these reserves.

Officials who are watching the trend in the coal trade are fearful that consumers are backsliding, if any of them were really converted to the storage idea last year. The real belief is that it was circumstances rather than vision and altruism that resulted in the large storage of last year, making possible the remarkable performance of the railroads during that year.

It is apparent that should the present trend go on unhaltered, the railroads will be called upon next autumn to handle a high peak of coal movement at a time when they will be less able than ever before to handle such a contingency.

In 1923 coal consumers regularized their purchases of coal so as to make more uniform than ever before the employment at mines and the traffic burden on the railroads.

The characteristic curve showing coal production starts from a high point in January and drops gradually until May, when it turns downward sharply and runs at a low level until October, when it rushes again into the winter peak. In 1923, however, the curve was unprecedentedly flat. The curve of no other commodity was so free of peaks and valleys. The railroads were delighted. It made possible their premier traffic performance. The only coal that they had to handle during the crop-moving period was the normal production of 10,000,000 tons a week.

Even Movement Forced in 1923

In 1923 there was an unusual combination of circumstances, however, which did much to force the even movement of coal throughout the year. At the beginning of the year stocks were abnormally low because of the preceding year's strike. They were below the safety point. Consumers were well aware of it. They started to build up their stocks with a vim, because of the various uncertainties of the situation ahead. They even bought steadily on a declining market. This is an extraordinary occurrence in any commodity and doubly so when the commodity is coal.

Then just at the psychological moment the Interstate Commerce Commission handed down a decision which abolished assigned cars. It was virtual notice to the railroads that they must protect themselves in the matter of coal supply. They lost no time in

establishing reserves. They accumulated an amount of storage which had been exceeded only in one previous year.

The advent of 1924, however, found the situation reversed. Instead of low stocks, consumers were starting the year with very heavy stocks. Their stocks were above any margin of safety which has been regarded as necessary. The possibility of a strike, however, kept most consumers from drawing on their reserves. As a consequence production continued at a high rate until the Jacksonville agreement was signed. Immediately thereafter shipments began to decline.

The natural time to begin drawing somewhat on the stockpile is at the end of cold weather. This year, despite the continuance of cold weather, the curve has plunged downward far earlier than in the normal pre-war year. It has carried with it the spot price, which is now lower than at any time during 1923. The assumption is that it is going to be very difficult, indeed, to prevent a return to the old policy of living from hand to mouth.

Railroads Can Help Themselves

An unusual opportunity is offered by this situation for the railroads to help themselves and to do a public service. The carriers know better than does anyone else that they cannot handle the bituminous-coal traffic during a year of average prosperity if it cannot be spread fairly evenly over the twelve months of the year. The railroads use 28 per cent of the total bituminous-coal output. If they will concentrate their orders during the spring and early summer and build up as much storage as can be carried reasonably, they can do much to prevent a car shortage next autumn. In that connection the suggestion is advanced that an accounting system should be devised by the railroads whereby the use of cars for company fuel during periods of car shortage should be charged at the rate which the car would have been earning had it not been withdrawn from the commercial haul for which it could have been utilized.

This simple expedient, it is believed, would do much to prevent coal purchasing agents from speculating and withholding purchases for possible lower prices. At the same time it would give the railroads a figure in dollars and cents to bring home to them the losses of revenue which result from having to use large numbers of coal cars for company fuel during a period of car shortage when revenue freight is being denied movement.

It is possible that some plan will be worked out whereby inducements can be held out to consumers to store during the spring and summer months.

Hoover Denies Supporting Open-Price Associations

Commerce Secretary Hoover hit back hard when Samuel Untermyer attacked his proposal to Senator Capper that centralized buying should be legalized so as to meet the menace of foreign combinations in essential raw materials. Secretary Hoover meets the charges in a letter dated March 21 to Senator Capper, in part as follows:

"He knows or should know that his statement is absolutely false when he says I ever supported the so-called open-price associations. I informed him specifically and personally two years ago that he should not repeat this misstatement for it was false, and that I was vigorously opposed to this practice or any other form of price control. I have, in fact, repeatedly advised the business world that it should not be engaged in this practice regardless of whether it proved legal or illegal, because it was against public interest. Furthermore, as a result of the work of this department and the Federal Trade Commission most of these so-called open-price associations have been abandoned."

"He knows or should know that the Webb-Pomerene Act was passed under the last administration for the purpose of enabling American exporters, under regulation by the Federal Trade Commission, to establish joint selling agencies for foreign trade and that the act in express terms prohibits its use for the control of domestic prices or for any restraint of trade within the United States."

Move to Broaden Activities Of Bureau of Mines

Representative Robson, of Kentucky, chairman of the Committee on Mines and Mining of the House of Representatives, has taken an unusual step in calling upon his committee to consider the broad proposition of how the Bureau of Mines can be made more serviceable to the mining industry. While there will be scrutiny of the existing activities of the bureau to determine whether or not equivalent effort expended in other directions would be of greater practical value, the main purpose of the study will be to find out how the work of the bureau may be expanded to greatest advantage.

It will be recalled that President Coolidge has declared himself to be in favor of a greater Bureau of Mines rather than attempting to create a Department of Mines at this time. In view of that declaration of administration policy, Representative Robson believes that his committee is in a position to be helpful in determining the lines along which the bureau's activities should be increased. He expresses the personal hope that there may be a decided augmentation of the bureau's work in connection with the safety problem in coal and metal mines.

As this is written, the exact date for the conduct of these hearings has not been determined, but Chairman Robson hopes to convene them early in April.

A New Kansas Row

The newest row affecting coal down in Kansas is the effort of Governor Jonathan I. Davis to replace James Sherwood, chief mine inspector, with Leon Besson, who was state inspector up to 1913, elected by the miners in the days of the old Society of Miners. The Governor announced the appointment several days ago. But he reckoned not with the Kansas Industrial Court, which declared, March 21, that its approval is necessary before the appointment can take effect, and that it may not approve. Besson is regarded as a radical and a friend of Alex Howat, deposed president of the Kansas district of the United Mine Workers. It is reported that Ernest Shaw, a deputy inspector, may get the appointment as a compromise between the Governor and the Court. Besson's appointment would be a Howat victory.

May Evict Striker from Company House Without Notice, Says W. Va. Court

A "rule of property" decision that will establish a legal precedent for the mining industry everywhere in America was laid down in the decision of the West Virginia Supreme Court of Appeals at Charleston, W. Va., last week, in an appeal from an eviction suit.

Under this decision a mine owner may recover possession of his houses the moment his employees quit work, and without the slightest notice to them. He may use necessary physical force, such as knocking down doors or tearing out windows of the house, or may even tear down the house, if he chooses, while evicting a striking tenant who refuses to give up possession of a company house. This decision was handed down in the case of Watt Angel vs. Black Band Consolidated Coal Co., of Kanawha County, which was a test case in the state courts, on the part of the defendant company to obtain the "rule" which has been requested by federal courts when injunction cases are heard.

The syllabus in the case was written by Judge James A. Meredith, president of the court. The decision stated:

The houses are not kept for rent generally, but are occupied only by the company's employees, and then only by its consent. Under these conditions a miner is employed, is furnished a house, he moves in, continues his employment for a number of years, and the deductions for rent are regularly made from his wages every two weeks; he then voluntarily quits work and pays no rent thereafter. There being no agreement that he should occupy the house for any definite period, when he ceased work for the company his right to occupy the house also ceased.

Georges Creek Miners Accept 8 per Cent Wage Cut

Two hundred coal miners who went on strike March 18 at the Jackson mine of the Georges Creek Coal Mining Co. at Lonacoming, Md., because of a reduction in wages, returned to work on March 20, after a conference with General Superintendent Gerdetz and a general meeting held on March 19. There was extended discussion of the proposed reduction, at the conclusion of which the miners in a secret ballot decided to accept the cut, and returned to work.

Notice of the proposed reduction was posted at the mine on Saturday, March 15. This company, in which Pittsburgh people are largely interested, continued to operate its mine in agreement with the union during the period following the 1922 strike when other mines were operating on a non-union basis, and paid miners the scale fixed by the union, being the only company of any size in the western Maryland field which did so. It was necessary not long ago to effect a reduction, so that the one just announced is the second. It is stated that the second cut contemplates a shift from day wages to the checking system of 85c. a ton. Production has been at the rate of from 10 to 15 cars of coal a day.

The only exception made to the general plan proposed by the company is as to the pay of miners employed in the longwall headings, who will receive a minimum of \$5 per day, eight hours to constitute a day, thus eliminating the checking system of 85c. per ton. Otherwise there has been a general reduction.

It is stated by Superintendent Gerdetz that the proposed reduction averages about 8 per cent, applied to all classes of labor. He points out that prices have dropped nearly 30 per cent in the last three months and that the company cannot continue operations unless there is a reduction. He also states that the company has planned to increase its working force to 300 men.

More Illinois Mines Sold

Two more sales of Illinois coal property were completed last week. The Harrisburg Colliery Co.'s Harco mine was bought by C. E. Karstrom, representing other interests, and the two Newsam Brothers mines in the Peoria field were purchased by the Crescent Coal Co., of Peoria. The Harco mine, a 4,000-tonner and one of the leaders in Saline County, has been eyed with interest for many months by various Saline County interests, including Big Creek Coals, Inc. The titular purchaser, Mr. Karstrom, vice-president of the Shoal Creek Coal Co., was vice-president of Big Creek Coals until 1920. The purchase and operation of this mine by Mr. Karstrom does not change the name of the Harrisburg Colliery Co. and is not regarded as interfering seriously with a probable consolidation of the principal Saline County companies several months hence.

U. S. Steel Coal Output Jumps 42 per Cent

Coal mined by the United States Steel Corporation during the year ended Dec. 31, 1923, totaled 35,289,901 tons, an increase of 11,996,430 tons over the production in the previous year. Of the coal mined, 28,234,030 tons was used in the manufacture of coke and 7,055,871 tons was used for steam, gas and all other purposes. During the same twelve months 18,837,631 tons of coke was manufactured, of which 11,694,730 tons was produced by byproduct ovens and 7,142,901 tons was manufactured in beehive ovens.

During the year \$12,749,606.03 was expended in maintenance and replacements on the coal and coke properties, as compared with \$8,084,895.73 in 1922, an increase of \$4,664,710.30.

Capital expenditure on the coal and coke properties during the year were \$8,079,269, of which \$461,958.84 was expended for the acquisition of 2,073 acres coal lands in Fayette, Mercer and Greene Counties, Pennsylvania, and in Vermilion County, Illinois, and for 339 acres surface land in Fayette County, Pennsylvania. In the Connellsville district for facilities to increase the output of coal and for underground transportation \$3,688,250.26 was spent.

The corporation employs 33,354 persons on its coal and coke properties, as compared with 26,856 persons in 1922.

In the western Pennsylvania fields \$4,989,776 was expended in the opening and development of new coal operations.

The corporation spent \$1,763,417 during 1923 for accident prevention and safety work, as compared with \$1,175,171 in 1922.

The northern coal and coke property of the corporation comprises 252,908 acres of coking coal and 183,756 acres of steam and gas coals. The southern coal and coke properties consist of 171,617 acres of coking coal and 170,398 acres of steam and gas coals.

Must Pay for Coal Mined in Federal Land in Alabama

Millions of tons of coal have been mined by individuals from government reserves in northern Alabama, according to federal investigators. G. B. Morgan and J. A. Ramsey, of the Government Land Office, after checking all available records in Montgomery and Birmingham, are now in Jasper, Ala., winding up the inquiry.

The inquiry covered 75,000 acres, and the investigators reported infringements on some of the most valuable coal lands in the state. It was announced that all the alleged trespassers will be given opportunity to settle amicably by paying the government for the coal taken. Otherwise suits will be instituted, it was stated.

The object of the investigation, according to Morgan and Ramsey, is not only to stop trespassing and collect damages due the government but also to take steps to insure protection of government reserves in the future. The government in years past has transferred many acres to the state government, but has always reserved mineral rights. The inquiry chiefly concerns this land.

New England Dealers Assail Badly Prepared Anthracite

The New England Coal Dealers Association held its annual convention in Boston on March 20 and 21 with a record attendance. Horticultural Hall was converted into something like a modern coal yard for the two days, and many of the latest appliances for handling coal were installed for exhibition purposes. Mechanical devices for scooping, loading and unloading were shown by the manufacturers, connected with electric power in the hall or operated by their own motors. The two leading coke producers of New England occupied large areas and there also was an exhibit of bituminous coal that had been chemically treated for domestic use. There were numerous belt loaders on exhibition, and dump wagons, coal trucks of many kinds, and a new type of bucket loader made up the rest of the equipment that was of special interest to the visiting coal men.

W. A. Clark, of Northampton, Mass., was elected president for the 12th year, and G. A. Sheldon, of Greenfield, Mass., and C. R. Elder, of New Britain, Conn., were respectively re-elected treasurer and secretary. Those elected vice-presidents were J. Calvin Miller (Maine), H. A. Osgood (New Hampshire), N. E. Pierce (Vermont), E. A. Wilson (Massachusetts), G. L. Miner (Rhode Island), and J. B. Gregory, Jr., (Connecticut). R. S. Hays, of Newport, R. I., and Herbert C. Edwards of Lewiston, Me., were elected to vacancies on the executive committee.

The feature meeting was on Friday afternoon, when a vigorous resolution was adopted conveying the dealers' "most urgent request to the anthracite producers that a more uniform and satisfactory standard be established and maintained." The preamble to the resolution declared that "the complaints of the public during the post-war years have convinced us that there must be abnormal impurities in anthracite," and "though we know that properly prepared anthracite is the most economical of fuels, the public will purchase any substitute for poor anthracite at present prices."

The convention then tabled another resolution in favor of limiting anthracite to two sizes, acclaiming the statement of a member of the resolutions committee that "the condition of the coal business is badly enough upset now, due to the bad quality of coal, without upsetting it more by changing the sizes."

There were two interesting addresses the same afternoon; one by Walter D. Rogers, executive secretary of the National Retail Coal Merchants Association, on "The Retail Coal Dealer at Washington," and the other by J. M. Dunphy on "The Small Anthracite Coal Problem and Its Solution," with special reference to the pyramid grate.

E. S. Brooks Dies at 66

E. S. Brooks, vice-president and general manager of the Union Pacific Coal Co., died at his home in Rock Springs, Wyo., March 17 of heart trouble at the age of 66. He became

Utah Miners Not Afraid

There is no superstition among Utah miners to make them hesitant about working in the burned-out No. 2 mine of the Utah Fuel Co., at Castlegate, in which 173 men were killed March 8. Possibly it is because many Utah miners want a chance to earn a living. Possibly it is because they want to work for a good company. But for whatever reason, more than 200 men outside the company's employ have already applied for jobs to replace the 173 dead men, and more applications are coming in.

superintendent of the company's mines at Hanna, Wyo., in 1894. In 1906 he was made superintendent of the anthracite mines of the Southern Pacific Ry. Co. in old Mexico and in 1911 took charge of the Washington Union Coal Co.'s Tono Mine, in Washington. Since 1920 he had been at Rock Springs in charge of the Union Pacific mines.

World Coal Output in 1923 Near High Mark of 1913

World's total production of all coal in 1923 was approximately 1,335,000,000 metric tons, according to the Geological Survey, but information is still incomplete. In comparison with the preceding year this was an increase of 112,000,000 tons, and it was but 7,000,000 less than the output in 1913, when the high record was established. The principal factor in the improvement over 1922 was an increase of 34 per cent in the production of all coal in the United States. All countries listed, however, with the exceptions of Germany and Japan, showed increases and the output by France was but 3,000,000 tons below the pre-war level. The

E. J. McQuail Ends Life

E. J. McQuail, chief executive of the Turkey Gap Coal & Coke Co., the Coe Pocahontas Coal Co., Ennis Coal Co. and American Coal Co., residing at Bluefield, W. Va., committed suicide March 24 by blowing out his brains with a pistol. No reason can be assigned for the deed. Those who were with him shortly before the act state that he was in his usual frame of mind and noted nothing out of the way.

Mr. McQuail was the son of William McQuail, who came to West Virginia from Shamokin, Pa., thirty-five years ago and opened up the mines of the Turkey Gap Coal & Coke Co. at Ennis. Upon the retirement of his father from active business about five years ago Mr. McQuail became the executive head of all the McQuail interests. He was about forty-five years of age, enjoyed good health, happy family relations and his coal companies are considered among the soundest of any in the state. James A. McQuail, of Mercer County, West Virginia, and Ennis McQuail, of Philadelphia, are brothers of the deceased.

world's output in 1923 was 16,000,000 tons larger than in 1920, an increase that was largely due to recovery in the production of the United Kingdom, France, Poland and Russia, which more than offset the decrease in the United States.

It is of interest to note the tremendous decline in the production of coal in Germany. According to a report by the German Imperial Coal Council, published in the *Colliery Guardian* of Feb. 1, 1924, the output of coal was 55,000,000 tons, a decrease of 58 per cent from production in 1922. The production of lignite also declined and totaled approximately 125,000,000 tons, a decrease of nearly 10 per cent. The report attributes the decline to the economic disorders that attended the occupation of the Ruhr.

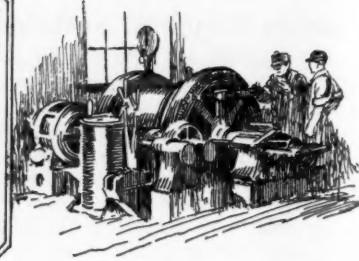
Coal Produced in Principal Countries of the World in Calendar Years 1921, 1922 and 1923

Country	(In metric tons of 2,204.622 lb.)		
	1921	1922	1923
North America			
Canada { Coal.....	10,684,259	10,587,611	15,542,294
Lignite.....	2,975,598	3,162,907	
United States { Anthracite.....	82,076,000	49,607,344	86,585,000
Lignite and Bituminous.....	377,316,000	383,073,174	494,772,000
Other countries.....	(a)	(a)	(a)
South America.....	2,040,598	1,917,493	(a)
Europe			
Belgium.....	21,750,410	21,208,500	22,916,070
Czechoslovakia { Coal.....	11,648,399	9,906,261	11,624,748
Lignite.....	21,050,712	18,942,920	16,202,496
France { Coal.....	28,211,839	31,163,032	37,714,393
Lignite.....	748,634	777,813	862,422
Germany { Coal (b).....	136,227,231	129,964,597	55,000,000
Lignite.....	123,010,036	137,207,125	125,000,000
Saar.....	9,574,484	11,240,000	8,950,000
Poland.....	7,842,533	23,800,000	(d) 37,000,000
Russia.....	7,611,900	8,914,600	11,707,200
United Kingdom { Great Britain.....	163,781,404	253,613,054	282,970,535
Ireland.....	89,958	(a)	(a)
Other countries.....	(a)	(a)	(a)
Asia			
British India.....	19,612,759	19,316,112	(d) 19,000,000
China.....	19,876,375	21,300,000	(a)
Japan (inc. Taiwan and Karafuto) (c).....	27,418,000	29,150,000	28,000,000
Other countries.....	(a)	(a)	(a)
Africa			
Union of South Africa.....	10,339,044	8,830,774	10,800,000
Other countries.....	(a)	(a)	(a)
Oceania			
Australia.....	13,084,210	12,496,417	(a)
Other countries.....	(a)	(a)	(a)
Total.....	1,132,400,000	1,223,000,000	1,335,000,000

(a) Estimate included in total. (b) Of which the Ruhr produced as follows: 1921, 94,114,785 tons; 1922, 97,346,176 tons; 1923, 40,000,000 tons. (c) Exclusive of lignite from Japan (annual production of about 200,000 tons) for which estimate is included in total. (d) Estimated from figures for first 11 months.



Practical Pointers For Electrical And Mechanical Men



Where Electric Power Can Be Saved

Insulation Leakage, Poor Bonding, Use of Heaters and Lights Unnecessarily, Insufficient Cross-Section in Conductors, Underloading of Induction Motors All Cause Excessive Power Bills

In the past when nearly all coal companies generated, at their own plants, the power used to operate their mines, employees were uneconomical in the use of electrical energy. They wasted it both in the mines and in their homes as if it were of no value. But now that the use of purchased power is increasing, we begin to realize our wastefulness and we are commencing to comprehend that something must be done to eliminate this costly and unnecessary expense.

On visiting mines, any number of wasteful practices may be noted, but one cause of loss that should be given due consideration on all such occasions is lack of electrical insulation. Some mines have smooth dry stone roofs, while in others the roof is damp and irregular, and in this a better quality of insulation is required if the current is to be used with economy equal to that attained with a dry roof.

INCOMPLETELY GLAZED INSULATORS

For an example, let us take the feeder circuit or "machine line" as it is commonly termed. This is usually arranged so that it may be cut in or out of service independent of the trolley circuit. It is probable that the most popular type of insulator now being used on this circuit is that known as the security insulator, which gives satisfactory service where little or no dampness is encountered. However, as its entire surface is not glazed, a path for the leakage of current is afforded if the insulator is exposed to excessive moisture for a considerable length of time. This leakage may be small, but when we consider the number of insulators employed under these and similar conditions, we shall soon realize that the total leakage or waste of current may form an important part of the monthly power bill.

Until some manufacturer of such products places on the market a wet-ware porcelain insulator for this particular purpose, I am unable to recommend any standard for use in such mines. However, I am firmly of the belief that the additional cost of a wet-ware porcelain product over the present grade of insulator would be small as compared to the savings that a reduction in the leakage of current would effect.

Other power losses from the electrical system are due to poor bonding, to

heaters operated needlessly, to lights kept burning when their illumination is not required, and to copper conductors of insufficient carrying capacity. Poor bonding is no longer excusable, especially since the new copper-weld bond has made its appearance on the market. These bonds are inexpensive, and little skill and labor is required for their installation. When properly installed they afford 100-per cent contact surface, this being an entirely new feature with welded bonds, especially when installed by an inexperienced operator.

A large saving of power may be effected by connecting all the lights and heaters to the trolley circuit, leaving none of them energized from the machine circuit where they would probably be left in operation every hour of the day and night, regardless of the requirements. When the last motor trip for the day is completed, the trolley circuit should be disconnected from its source of power supply, thus relieving the light and heater load. At the same time, the pumps, fans, necessary signals, etc., may be supplied with current from the machine circuit.

These minor electrical loads are seldom given any consideration by the employees of a mine, and frequently the executives in direct charge of affairs scoff at them. Nevertheless, such continued savings, though small, are sure to net a handsome reward.

LOST OVER 100,000 KW.-HR. A YEAR

As an example of the importance of such leakage, I am taking a rather modernly equipped mine with which I am familiar, which has an average output of approximately 1,200 tons per working day.

Through various tests at this mine it was shown that it was convenient to relieve the load of the trolley circuit about 8 hours of each working day, and the whole 24 hours on Sunday, or a total of 72 hours per week, which amounts to 3,744 hours per calendar year, without considering idle days. The waste load, due to leakage, lights and heaters was found to be 112 amperes, which at a pressure of 275 volts is approximately 31 kw., or 41 hp.; this in the 3,744 idle hours of the year would result in a loss of 116,064 kw.-hr.

Let us trust that the readers of this article will bear in mind the value of these large figures, and that in the

future on no occasion will they hesitate to take a few extra steps to prevent the use of any circuit unnecessarily.

Another consideration particularly pertaining to purchased energy is that of the power-factor. When induction motors are used it should be remembered that an under-loaded induction motor requires nearly as much current as when operated at full load; hence such motors should be applied to loads so as to operate at full capacity most of the time.

The loss of a credit for good power-factor or the payment of penalty for a poor power-factor may not seem to be large on a monthly power bill, but in the total power cost for the year, it may amount to a considerable figure. Many people forget that poor power-factor loads reduce the efficiency of the whole power system, resulting in a much greater consumption of power than necessary.

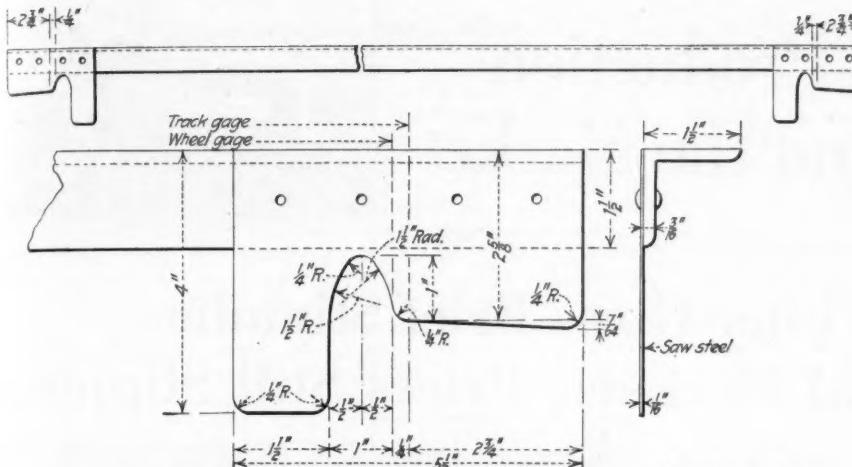
ROYCE L. GRIMES.
Electrical and Chemical Engineer.
Piney Fork, Ohio.

Checking Locomotive Wheels Before Using

Never be indifferent in regard to the condition of your locomotive wheels. They are just as important as any other part of the machine. Unless the wheels of a locomotive are of proper size parts of the locomotive frame, gear cases or the motors may drag on the ground with serious consequences. If the wheels have false flanges the track is soon torn to pieces, frogs and crossovers are damaged and wrecks occur. Wheels which are not set at proper gage may spread the rails or become uncontrollable at switches.

These are only a few of the many reasons why locomotive wheels should be always kept in good operating condition. Even under normal operation the wheels of some locomotives may wear rapidly and must therefore be renewed. When it becomes necessary to change a set of locomotive wheels a thorough inspection of the new wheels should be made. Such an inspection should reveal any defects in the material, incorrect assemblage or design. If the tread of the wheels has not been properly shaped it may cause accidents as serious as those resulting from the use of wheels with false flanges. The wheel gage should be checked at the four quarters of the wheels so as to be sure that the axle is true and that the wheels and tires have been properly placed.

Necessarily the expense of renewing a set of locomotive wheels is always



Are Your Wheels True? With Gages Like This, You Can Find Out

Two saw-steel templates on the end of the gage are shaped to fit the standard wheel tread. By placing them on the treads the position of the wheels on the axle can be readily checked. Thorough inspection and the use of a gage like this will materially reduce accidents and delays.

great, for the locomotive must be taken out of service and large quantities of material must be handled and used at the expenditure of much labor. Consequently, the work should be well done and the material should be accurately designed. Ordinarily the work at the mines merely consists of changing the wheels and axles; that is, the machine work of assembling the wheels on the axles and the work of turning down worn wheel treads is done at a machine shop located some distance from the mine.

In any event, whether the machine work is done in the mine repair shop, located on the immediate property, or whether it is done at some outside shop, there is a great probability that the wheels may be out of true when they reach the locomotive pit.

To enable our electricians to check a new set of wheels before they are placed under a locomotive our depart-

ment designed a gage to be used for this purpose. This gage is made of two pieces of $\frac{1}{8}$ -in. saw steel cut to fit the shape of our standard wheel tread, and mounted on a piece of angle iron in such a position as to fit accurately a standard set of wheels when properly placed on the axle.

When a new set of wheels and axles are received at the mine a thorough check is made of the material and the gage is placed on the wheels at four quarter positions on the circumference. The templates at the ends of the gage show whether the treads are properly shaped. By this test it is possible to determine whether or not the material has been received in good condition. Later a similar test is made inside the mines to be sure that the wheels have not been damaged or the axle bent in transit to the locomotive pit.

O. E. KENWORTHY.

Wilkes-Barre, Pa.

Giving Trolley Bushings Lubrication and Life

In several articles that have appeared in *Coal Age* regarding trolley wheels and bushings, they have been truthfully described as the weakest parts in the equipment of an electric locomotive. It is easy to see why this is so. The 4-in. trolley wheel attains a high velocity when the locomotive is running at normal speed and the contact of the wheel on the wire is so small that it is a wonder that we get the good service that we do.

No electrician would think of connecting a 100-hp. stationary motor to a power line simply by throwing a wire or a cable over it. Yet such a wire would afford a connection almost as efficient as that which a locomotive has with the trolley wire by which it is energized, and few haulage locomotives are equipped with motors having a total capacity less than 100 hp.

The connection between a trolley wheel and trolley wire is poor even under the best of conditions, such as are found immediately after a new bushing and axle-pin have been installed. As the bushing wears and the axle-pin becomes pitted and roughened, the contact becomes bad. Springs are

often neglected, with the result that the wheel has much lost motion between its sides and the trolley harp. Of course, these conditions may be caused by the motorman not taking proper care of his trolley equipment. But you can find them in almost any mine, and this seems to indicate that something should be done to improve the performance of trolley wheels.

However, not all is said when it is stated that the contact is defective. It is expensive to be replacing bushings and axles constantly, and still more expensive to be discarding wheels before they are worn out, just because someone neglected to put in a new bushing. When the whole trouble is traced down, it seems to be a question of proper lubrication. Most motormen oil their wheels several times a day, but they pour the engine oil only on the outside, and in consequence it never gets to the center of the wheel where it is most needed. When a bushing is new it is too tight for the oil to penetrate very far, and if the bushing is old and worn, the thin layer of oil that clings to the surface does not last very long.

Not long ago, we decided to use a larger trolley wheel with a $\frac{3}{4}$ -in. axle instead of the 4-in. wheel we had been

using. When we received the new wheels and harps, I noticed the axle pins were made of ordinary $\frac{1}{4}$ -in. pipe with a small hole in each end for cotter pins. This hollow axle gave me an idea. I plugged one end of it and bored a small hole at the center of the axle and tapped the other end so that it would take a $\frac{1}{4}$ -in. high-pressure grease gun fitting similar to those used on automobiles. I also bored a hole at the center of the wheel bushing and marked its position on the wheel so that it could be aligned with the hole in the axle. With this arrangement, it is possible to fill the grease reservoir in the wheel through the hollow axle. When the wheel is in operation the grease will be forced out of the reservoir and lubricate the bushing and axle. A light grade of grease was used in the reservoir so that it would flow as required. The motorman filled the reservoir in the morning and gave his trolley wheel no more thought for the rest of the day.

The first trolley-pole head fitted in this way was still working without any appreciable wear on the bushing or axle after three trolley wheels had been worn out. There is no reason why one bushing should not outwear a dozen trolley wheels. We now make our own axles from solid steel, using a $\frac{1}{4}$ -in. elbow fitting instead of the straight one, thus making application of grease easier and avoiding a few minor defects that developed in the first axle.

C. L. LOGAN.
Superintendent.

Greenbrier Coal & Coke Co.
McDowell, W. Va.

Cleaning Insulation From Copper Coils

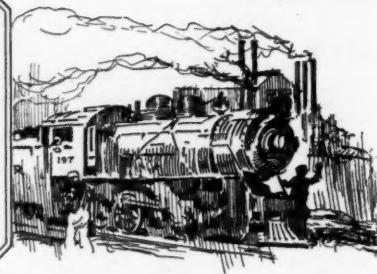
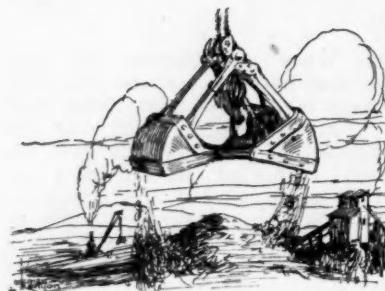
It has been common practice to burn the insulation from old coils. This should not be done where the coils are to be reinsulated and used again. The question then comes: How are we going to remove the old insulation? One big operator places the coils in an oven and passes steam through the coils for 12 or 14 hours. He finds that the insulation peels off easily while hot. Another operator dips the coils in a weak solution of muriatic acid for a time (approximately 24 hours), so that the acid weakens the insulation, but not long enough to give the acid a chance to eat into the copper. The necessary time required can easily be established by checking carefully and removing the coil when the brightening of the copper commences. After the acid treatment the coils should be thoroughly washed in clear water.

Circumference of Chestnut Poles

In Inches

Length of Poles	Class A		Class B		Class C	
	Top	6 Ft. from Butt	Top	6 Ft. from Butt	Top	6 Ft. from Butt
30	24	40	22	36	20	33
35	24	43	22	39	20	36
40	24	45	22	42	20	39
45	24	48	22	46	20	43
50	24	51	22	49	..	..
55	22	54	22	53	..	..
60	22	57	22	56	..	..
65	22	60	22	59	..	..
70	22	63	22	62	..	..

Production And the Market



Parting Blast of Winter Gives Brief Stimulus To Soft-Coal Markets; Prices Still Slipping

A blast of honest-to-goodness winter weather in a large section of the Middle West during the last week served to instill some sadly needed vim into the coal business. The improvement was not very broad in character, however, being confined mostly to domestic business, where consumers have been buying from hand to mouth for some time. Large consumers continue to place dependence to a large extent upon stockpiles, confident that they have nothing to lose—perhaps something to gain—by waiting to see what April 1 will bring forth. Continued price adjustments seem to justify the policy.

Another cloud in the industrial sky will soon be cleared away, an agreement being near between the Northern West Virginia Coal Operators' Association and the union mine workers after a conference at Baltimore lasting ten days. Wyoming also has signed up. Union representatives of the central Pennsylvania field wound up their meeting at Altoona last week with the adoption of a recommendation to seek the best scale obtainable for three years at a conference with the operators in Philadelphia this week.

Coal Age Index declined 3 points to 176, as of March 24, the corresponding average price being \$2.13. This compares with \$2.16 on March 17.

Raw Weather Awakens Midwest Markets

Domestic coal has been moving rather freely in small lots from Illinois and Indiana fields as a result of a parting blast of winter. Steam coals have their own troubles, however. The closing of a number of mines that is expected April 1 probably will have the effect of bolstering up this market somewhat. Mines in the Duquoin, Jackson County, Mt. Olive and Standard fields are working from two to four days a week and some of the mines are preparing for a long suspension.

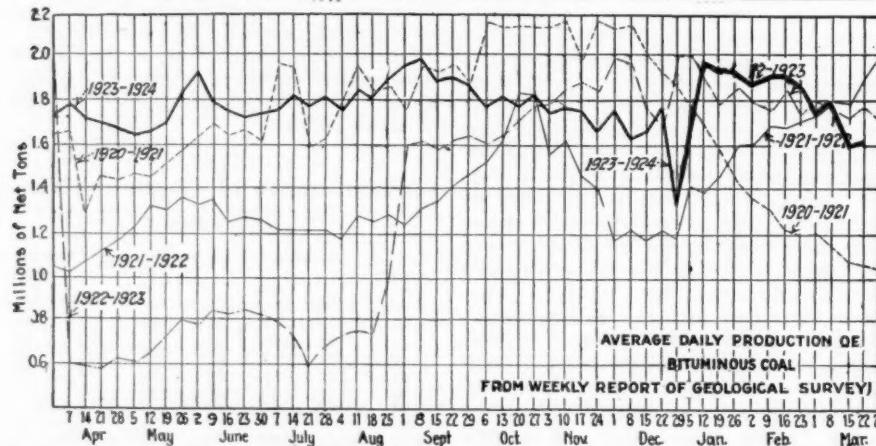
In western Kentucky the mines are running only about a day and a half a week. Prepared sizes are moving better than expected, but in spite of an effort to hold prices firm, operators have been forced to accept the low side of the market range. Even with the light production of screenings in eastern Kentucky selling has been at low prices, the range being 75c.@\$1.15. With a low market reigning there is a hope that there may be some early buying by lake shippers to load vessels at lower lake docks for early movement, though the normal start of the lake shipping is still rather remote.

Northwestern Markets Lifeless

Coal markets in the Northwest are absolutely without life, business being conspicuous by its absence. With about 1,300,000 tons of coal on the docks and demand lacking, prices have taken a tumble. Kentucky coal alone holds its level—because of the short supply. The Southwest is doing better, as a suspension is looked for, there being insufficient time to reach an agreement on wages between March 28, when the parley begins, and April 1.

A deadly dullness has settled over the Ohio markets. Similar conditions prevail in the Pittsburgh district and New England, and the situation in the Atlantic seaboard markets is little better. The Birmingham market is more optimistic, an improvement in inquiry and bookings having been noted.

Production of bituminous coal during the week ended March 15 amounted to 9,640,000 tons, according to the report of the U. S. Geological Survey, which was 23,000 tons more than was produced in the previous week. Output of anthracite totaled 1,941,000 tons, a gain of 59,000 tons compared with the previous week, when 1,882,000 tons was produced.



Estimates of Production

(Net Tons)	
BITUMINOUS	
March 1.....	10,946,000
March 8 (a).....	10,628,000
March 15 (b).....	10,428,000
Daily average.....	1,738,000
Coal year.....	406,744,000
Daily average coal year.....	1,382,000
	522,719,000
	1,784,000
ANTHRACITE	
March 1.....	4,104,000
March 8.....	2,049,000
March 15.....	2,057,000
Coal year.....	52,352,000
	1,866,000
	1,882,000
	1,941,000
	307,000
	89,314,000
COKE	
March 8.....	366,000
March 15.....	410,000
Calendar year.....	3,886,000
	326,000
	307,000
	3,051,000

(a) Revised from last report. (b) Subject to revision.

Midwest Domestic Coals Move

A burst of raw, wintry weather throughout the Middle West during the past week has moved a good deal of domestic coal from almost all Illinois and Indiana fields. This has enabled producers to maintain the new reduced circular on southern Illinois coals fairly well although there has been a good deal of selling of \$3 lump at \$2.75 in spite of the awakening of the market. All purchases have been in small lots, of course. The reduction of March 13 on Franklin County coals won back a good deal of dealer trade that has long been lost to cheaper coals. Downward adjustments in all other competing fields were made then or since.

Steam coals are in trouble, however. Southern Illinois moves with difficulty at \$1.90. A good deal is sold at \$1.75. Central Illinois is back to \$1.50@\$1.60 in spite of its short rate advantage to Chicago market. Indiana screenings are in a slight slump also. This is not expected to continue more than a few days because everybody feels the domestic business cannot run strong very long. A reasonable volume of it may be expected right through April, but probably the number of mines that will shut down April 1 will reduce the total production to a point that will bolster up the steam market.

Continued cold weather keeps domestic tonnage fairly active, principally on lump, with egg and nut moving slowly. The mines seem to have a pretty fair surplus of all sizes generally left over, however, and are getting from two to four days a week. Railroad tonnage is easing up and the car supply is plentiful and transportation good. Independents are having a hard time cutting prices on the association members, but they are temporarily getting away with it, although prices are below cost of production.

Illinois Mines Prepare to Suspend

In the Duquoin and Jackson County fields miners are getting about three days a week—those that are working—while several are idle. Throughout both of these fields mines are beginning to prepare for a long period of suspension. In the Mt. Olive district everything has slowed up, though there is a better demand for steam than the supply. Mt. Olive proper is asking \$3 for 2½- and 3-in. lump, while in the surrounding territory the price is \$2.75 for 6-in. lump. In the Standard field the future looks bad and prices now are cut to the bone. Mines continue to suspend operations and those that are working on commercial coal are getting two and three days a week with a hard time to find a market.

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern		Market Quoted	Mar. 26 1923	Mar. 10 1924	Mar. 17 1924	Mar. 24 1924†	Midwest		Market Quoted	Mar. 26 1923	Mar. 10 1924	Mar. 17 1924	Mar. 24 1924†
Smokeless lump	Columbus....	\$7.00	\$3.85	\$3.85	\$3.50@ \$3.75		Franklin, Ill. lump	Chicago....	\$3.85	\$3.25	\$2.85	\$2.75@ \$3.00	
Smokeless mine run	Columbus....	4.50	2.10	2.10	2.00@ 2.25		Franklin, Ill. mine run	Chicago....	3.10	2.35	2.35	2.25@ 2.50	
Smokeless screenings	Columbus....	4.50	1.55	1.55	1.50@ 1.75		Franklin, Ill. screenings	Chicago....	2.05	1.80	2.00	1.75@ 1.90	
Smokeless lump	Chicago....	6.35	3.60	3.60	3.00@ 3.50		Central, Ill. lump	Chicago....	3.10	2.85	2.60	2.50@ 2.75	
Smokeless mine run	Chicago....	4.00	2.20	2.20	2.00@ 2.25		Central, Ill. mine run	Chicago....	2.60	2.10	2.10	2.00@ 2.25	
Smokeless lump	Cincinnati....	6.75	3.35	3.25	3.00@ 3.50		Central, Ill. screenings	Chicago....	1.60	1.60	1.70	1.50@ 1.60	
Smokeless mine run	Cincinnati....	4.60	2.40	2.25	1.90@ 2.50		Ind. 4th Vein lump	Chicago....	3.60	2.85	2.85	2.75@ 3.00	
Smokeless screenings	Cincinnati....	4.50	1.60	1.75	1.50@ 2.00		Ind. 4th Vein mine run	Chicago....	2.85	2.35	2.35	2.25@ 2.50	
*Smokeless mine run	Boston....	6.50	4.70	4.65	4.60@ 4.75		Ind. 4th Vein screenings	Chicago....	1.85	1.80	1.85	1.75@ 2.00	
Clearfield mine run	Boston....	2.60	2.00	2.10	1.65@ 2.50		Ind. 5th Vein lump	Chicago....	3.10	2.60	2.60	2.50@ 2.75	
Cambria mine run	Boston....	3.60	2.60	2.60	2.25@ 3.00		Ind. 5th Vein mine run	Chicago....	2.10	2.10	2.10	2.00@ 2.25	
Somerset mine run	Boston....	3.10	2.20	2.35	1.85@ 2.75		Ind. 5th Vein screenings	Chicago....	1.60	1.60	1.70	1.50@ 1.75	
Pool I (Navy Standard)	New York....	4.25	3.00	3.00	2.75@ 3.25		Mt. Olive lump	St. Louis....	2.85	2.85	2.75	2.75@ 3.00	
Pool I (Navy Standard)	Philadelphia....	4.50	3.00	3.00	2.75@ 3.25		Mt. Olive mine run	St. Louis....	2.50	2.50	2.50		
Pool I (Navy Standard)	Baltimore....						Mt. Olive screenings	St. Louis....	1.55	1.55	1.50		
Pool 9 (Super. Low Vol.)	New York....	3.50	2.25	2.20	2.00@ 2.40		Standard lump	St. Louis....	2.60	2.70	2.70	1.90@ 2.75	
Pool 9 (Super. Low Vol.)	Philadelphia....	3.70	2.30	2.30	2.10@ 2.50		Standard mine run	St. Louis....	2.10	1.95	1.95	1.90@ 2.00	
Pool 9 (Super. Low Vol.)	Baltimore....		2.05	2.30	2.00@ 2.50		Standard screenings	St. Louis....	.95	1.15	1.30	1.25@ 1.35	
Pool 10 (H.Gr. Low Vol.)	New York....	3.00	2.00	1.95	1.75@ 2.15		West Ky. lump	Louisville....	2.50	2.85	2.85	2.75@ 3.00	
Pool 10 (H.Gr. Low Vol.)	Philadelphia....	3.20	1.85	1.85	1.70@ 2.00		West Ky. mine run	Louisville....	2.05	1.70	1.70	1.40@ 1.85	
Pool 10 (H.Gr. Low Vol.)	Baltimore....		1.80	1.90	1.85@ 2.00		West Ky. screenings	Louisville....	1.70	1.30	1.30	1.25@ 1.35	
Pool 11 (Low Vol.)	New York....	2.50	1.60	1.40	1.25@ 1.60		West Ky. lump	Chicago....	2.85	2.60	2.60	2.50@ 2.75	
Pool 11 (Low Vol.)	Philadelphia....	2.60	1.65	1.65	1.55@ 1.75		West Ky. mine run	Chicago....	1.80	1.45	1.35	1.15@ 1.85	
Pool 11 (Low Vol.)	Baltimore....		1.65	1.75	1.50@ 1.70								

High-Volatile, Eastern

Pool 54-64 (Gas and St.)	New York....	2.35	1.60	1.50	1.40@ 1.65
Pool 54-64 (Gas and St.)	Philadelphia....	2.35	1.60	1.60	1.50@ 1.75
Pool 54-64 (Gas and St.)	Baltimore....	1.60	1.85	1.55@ 1.90	
Pittsburgh se'd gas	Pittsburgh....	3.60	2.55	2.55	2.50@ 2.65
Pittsburgh gas mine run	Pittsburgh....		2.30	2.30	2.25@ 2.35
Pittsburgh mine run (St.)	Pittsburgh....	2.35	2.10	2.10	2.00@ 2.25
Pittsburgh slack (Gas)	Pittsburgh....	2.50	1.35	1.45	1.30@ 1.40
Kanawha lump	Columbus....	4.50	2.60	2.55	2.40@ 2.70
Kanawha mine run	Columbus....	2.75	1.50	1.50	1.45@ 1.70
Kanawha screenings	Columbus....	2.40	1.05	1.05	1.00@ 1.10
W. Va. lump	Cincinnati....	3.60	2.85	2.85	2.25@ 2.75
W. Va. gas mine run	Cincinnati....	2.75	1.50	1.40	1.15@ 1.50
W. Va. steam mine run	Cincinnati....	2.75	1.50	1.40	1.15@ 1.50
W. Va. screenings	Cincinnati....	2.35	.90	.85	.75@ .95
Hocking lump	Columbus....	3.75	2.60	2.55	2.40@ 2.70
Hocking mine run	Columbus....	2.45	1.85	1.85	1.60@ 1.85
Hocking screenings	Columbus....	2.05	1.15	1.05	1.00@ 1.10
Pitts. No. 8 lump	Cleveland....	3.10	2.35	2.30	2.00@ 2.75
Pitts. No. 8 mine run	Cleveland....	2.35	1.80	1.80	1.75@ 1.90
Pitts. No. 8 screenings	Cleveland....	2.10	1.30	1.30	1.20@ 1.30

South and Southwest

Big Seam lump	Birmingham....	2.50	3.85	2.60	2.50@ 2.75
Big Seam mine run	Birmingham....	2.10	1.80	1.80	1.75@ 2.25
Big Seam (washed)	Birmingham....	2.35	2.10	2.10	2.00@ 2.40
S. E. Ky. lump	Chicago....	3.75	3.10	2.85	2.75@ 3.00
S. E. Ky. mine run	Chicago....	2.85	1.85	1.85	1.40@ 1.85
S. E. Ky. lump	Louisville....	4.00	3.00	3.00	2.75@ 3.25
S. E. Ky. mine run	Louisville....	2.85	1.75	1.75	1.40@ 2.00
S. E. Ky. screenings	Louisville....	2.25	1.05	.95	.75@ 1.15
S. E. Ky. lump	Cincinnati....	3.50	2.75	2.85	2.75@ 3.00
S. E. Ky. mine run	Cincinnati....	2.50	1.60	1.45	1.35@ 1.60
S. E. Ky. screenings	Cincinnati....	2.25	.90	.85	.70@ 1.00
Kansas lump	Kansas City....	4.50	5.00	4.50	4.50
Kansas mine run	Kansas City....	3.50	3.50	3.25	3.25
Kansas screenings	Kansas City....	2.60	2.25	2.50	2.50

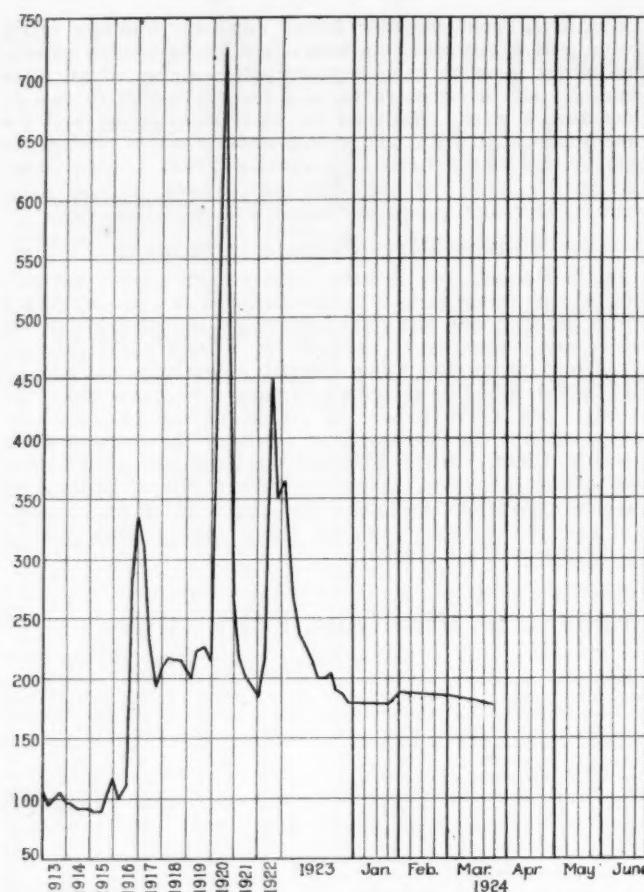
* Gross tons, f.o.b. vessel, Hampton Roads.

† Advances over previous week shown in heavy type, declines in italics.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

Market Quoted	Freight Rates	March 26, 1923 Independent Company	March 17, 1924 Independent Company	March 24, 1924† Independent Company
Broken....	\$2.34	\$9.00	\$7.75@ \$8.25	\$8.00@ \$9.25
Broken....	2.39		7.90@ 8.10	
Egg....	2.34	9.25@ 11.00	8.00@ 8.35	\$7.75@ \$8.25
Egg....	2.39	9.25@ 11.00	8.10@ 8.35	\$7.75@ 9.25
Stove....	2.34	9.25@ 11.00	8.00@ 8.35	8.75@ 9.25
Stove....	2.39	9.25@ 11.00	8.15@ 8.35	8.75@ 9.25
Stove....	5.06	12.00@ 12.50	7.20@ 8.25	7.50@ 8.80
Stove....	2.34	9.25@ 11.00	8.00@ 8.35	8.75@ 9.25
Stove....	2.39	9.25@ 11.00	8.15@ 8.35	8.75@ 9.25
Chestnut....	2.34	9.25@ 11.00	8.00@ 8.35	8.75@ 9.25
Chestnut....	2.39	9.25@ 11.00	8.15@ 8.35	8.75@ 9.25
Chestnut....	5.06	12.00@ 12.50	7.35@ 8.35	9.85@ 11.00
Range....	2.34		8.25	9.00
Pea....	2.22	6.30@ 8.50	6.15@ 6.30	4.50@ 5.25
Pea....	2.14	7.00@ 9.00	6.15@ 6.20	4.75@ 6.50
Pea....	4.79	7.00@ 8.00	5.49@ 6.03	4.50@ 5.60
Buckwheat No. 1....	2.22	3.40@ 4.25	4.00@ 4.10	2.25@ 3.00
Buckwheat No. 1....	2.14	4.00@ 5.00	4.00	2.25@ 3.00
Rice....	2.22	2.25@ 2.75	2.75@ 3.00	1.75@ 2.25
Rice....	2.14	2.75@ 3.00	2.75@ 3.00	1.75@ 2.25
Barley....	2.22	1.25@ 1.75	1.50@ 2.00	1.50@ 1.75
Barley....	2.14	1.40@ 2.00	2.00	1.25@ 1.50
Barley....	2.22		2.10	1.60@ 1.75

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type, declines in italics.



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	1924			1923
	March 24	March 17	March 10	March 26
Index	176	179	181	246
Weighted average price ...	\$2.13	\$2.16	\$2.18	\$2.98

This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913-1918," published by the Geological Survey and the War Industries Board.

St. Louis Market Fairly Active

Continued cold weather with flurries of snow has kept the St. Louis domestic market fairly active for small orders and cheaper grades principally. Dealers are able to keep their yards cleaned up and a little coal continues to move regularly. Country domestic shows up fairly well on the cheaper grades. There is no demand for anthracite or smokeless, though there is a little activity in coke. Local wagonload steam is easing up and country steam is fairly active. Effective the 15th new retail prices were: Carterville, \$7.25@\$7.50; Mt. Olive, \$6.50; Standard, \$5.75; smokeless, \$14.50; anthracite grate and egg, \$15.75; anthracite stove and chestnut, \$16; byproduct coke, \$11; gas-house coke, \$10.50.

Kentucky Has Hard Sledding

Things are generally quiet in the Louisville market. It is reported that big buyers in many instances bought heavily in January and February, in the belief that there might be a general coal strike, and have been using up supplies on hand, with the result that even light production of screenings in eastern Kentucky has been selling at low prices. The present screenings market in Eastern Kentucky is 75c.@\$1.15 for nut and slack, including fine gas-coal screenings.

In western Kentucky, where mines are running only about a day and a half, screenings are quoted at \$1.25@\$1.35 for pea and slack, due to small production along with the fact that consumers who use pea and slack in automatic stoker feeds have been taking supplies rather freely in a

belief that there may be a shutdown of part of the field, which would almost close up production of the small size.

Prepared sizes are moving in spurts, and have been better than anticipated, due to continued cold weather in March. Western Kentucky is trying to hold prices firm, but is forced to accept the low side of the market range which is around \$2.75 for best block, \$2.50 for lump, \$2.40 for egg, and \$1.75@\$2 for nut, with mine run at \$1.40@\$1.85, and some stripper mine run at less than that.

In eastern Kentucky block is quoted at \$2.75@\$3.25, but \$3 is about the top on sales, as lump is \$2.50@\$3, egg \$1.75@\$2.25; nut, \$1.50@\$2 and mine run, &1.40@\$1.90.

In view of the present low markets there may be some early buying on the part of Lake shippers to load vessels at dock at the lower end of the lakes for movement in the early shipping season, but lake business hardly gets started as a rule before late May or early June.

Northwest Market Dormant

It would be hard to conceive of anything dearer than the bituminous market at Duluth at present. There is absolutely no business. Mild weather and uncertainty over the question of railroad rates, and resulting prices, has caused the buyer to hold off in hope of lower levels. As a result of the fact that approximately 1,300,000 tons of free bituminous is on the docks at present and that this amount is not needed now, prices have taken a tumble. Kentucky is the only coal that is holding its level, and this because of shortness of supply. Screenings are firm only because of short supply. The general reduction has been about 25c., prices being as follows: Kentucky lump, \$7, run of mine, \$6; screenings, \$4.25; Youghiogheny lump, \$6; run of mine, \$5; screenings, \$4.25; Hocking lump, \$5.75; run of mine, \$4.75; screenings, \$4; split lump, \$6.25; run of mine, \$5.25; screenings, \$4.25; Pocahontas lump, \$7.50; run of mine, \$6; screenings, \$4.75@\$5.

The coal market at Milwaukee is dormant, with little or no demand from city or country. There has been no change in the established schedule of prices on either hard or soft coal, but something is expected to happen by April 1. Mild weather continues to reduce coal consumption to the minimum.

West Does Better

A suspension of work for at least thirty days is expected in the Southwestern district as a result of the delay in the wage scale parley between operators and miners, which will begin in Kansas City March 28. It is considered unlikely that an agreement will be reached by April 1, when present contracts expire. In the meantime, as a result of continued cold weather and the recent reduction in price of domestic grades of Kansas coal, the market is absorbing the full output of the mines, which are working better than 60 per cent of normal time. Tracks are virtually clear of screenings, and only a few "no bills" of lump and nut are reported. Kansas coal is quoted at \$4.50 for lump; \$4 for nut; \$3.25@\$3.50 for mine run and \$2.50 for screenings.

The coal market in Colorado was considerably stimulated in the last week. Mines worked on an average of about four days in the southern fields. The present spell of seasonable weather has contributed much toward the coal industry and it is expected that business will be much better if this weather continues. Prices remain unchanged. The transportation and equipment situation has been very favorable throughout the state except in Routt County, where practically 90 per cent of the working time was lost on account of extremely bad weather preventing any railroad movements.

Steam coal is finding a better market in Salt Lake City now than domestic sizes, but the market is still characterized by dullness. Mines are working not more than two days a week, which is making it difficult for most of the operators to supply the demand for slack coal, now selling all the way from \$1 to \$1.50.

Sogginess Pervades Ohio Markets

In spite of reports that production has been edging off elsewhere and that here and there mines are closing down south of the river the record of car interchange at Cincinnati shows little diminution. Everything is up in the air. The market is soft and soggy. Domestic and run of mine prices got the worst of the slicing, so far as the price lists on high volatile is concerned. Producers of

standard Pocahontas and New River are standing by their guns and holding tight to the circular prices that came out March 1. Talk of contract business is being heard, though few are being entered into. Specialized coals are quoted as follows: Egg, \$2.50@\$3; block, \$3.50@\$3.75.

Dullness is the prevailing note in the Columbus market. Both the steam and domestic trade are quiet, not much business being booked. Retailers have fair stocks and with the winter practically over are loath to increase their stocks. Buying is from hand to mouth. Retail prices are irregular and there is considerable cutting among dealers in order to clean up before the stocking season. Utilities are using reserves largely. Railroad contracts are now being considered and they are going at extremely low figures. Several large railroad contracts were let during the past week. Steam prices are weak and irregular and there is a fair amount of distress coal on the market. Weakness in screenings has developed, but this is expected to be temporary.

There is little or no change in general market conditions at Cleveland. Operators and jobbers say that inquiries are mighty scarce; that there is little or no negotiation for contracts, and that there is still plenty of stock or surplus fuel in the coal piles of industries, public utilities and railroads. A taste of early spring weather during the past week has, if anything, depressed the retail market, and the yards still have good stocks from which present demands are being supplied. Inquiries from brokers for quotations on contract tonnage in large quantities are looked upon simply as feelers.

Production in the Pittsburgh district continues to decrease. The spot market is practically stagnant. Inquiry is limited and sales are hard to make. Some further wage reductions are being made in the Connellsville region, but at mines that ship steam coal.

The situation at Buffalo shows no change for the better. Complaints of poor business seem to increase, though they have been widespread for several months.

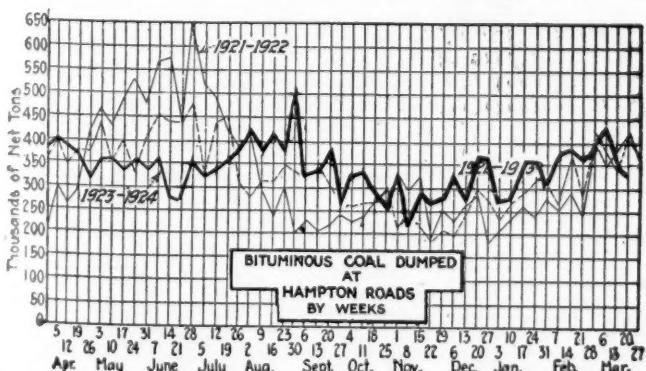
New England Dullness Unrelieved

In New England the market continues without relief from the dullness that has prevailed now for several months. In no direction are there signs of immediate improvement; both all-rail and by water there is a great dearth of business, and buyers are quite content to await developments. Among a few small consumers there is a certain amount of inquiry, but the larger steam users are well stocked for the present and there is no anxiety whatever over price or supply.

The Hampton Roads coals are holding reasonably well at what for most of the producers is the bare cost of mining. No. 1 Navy standard Pocahontas and New River can be had at \$4.60@\$4.75 per gross ton f.o.b. vessel at the Virginia terminals, but in some instances the agencies are withholding sales at this range and are sending prepared coals west, where the current market will yield a slightly more favorable return. Occasionally a sale offshore will net more than coastwise business, but there is no volume in that direction and there are few orders to pick from.

At Boston, Providence and Portland for inland delivery there are ample supplies available, and prices are none too strong. Those factors who are equipped with rehandling plants have a distinct advantage and quotations are held low enough to discourage others from sending coal forward on the market. On-car figures range from \$5.80 to \$6.25, but most of the current sales are at less than \$6.

Retail prices in Boston continue fairly weak, due to local



Foreign Market And Export News

Strong Demand in British Coal Market; Production Advances

The Welsh market shows marked improvement. Shipments have been seriously delayed by the lack of tonnage, but this is now coming forward much more freely, and the docks are busy again. There is still much talk of a strike in April, though the union leaders are at much pains to emphasize that a strike is not necessarily the natural outcome of the termination of the wage agreement.

These circumstances tend to increase the demand for Welsh coal, and the operators are quoting firm prices.

Negotiations have been reopened for the purpose of obtaining resumption of the three-shift working system. All collieries are overbooked with orders until the middle of April, and the trade is reluctant to accept new business.

The Newcastle market is somewhat stronger due to pressing European demands in anticipation of a strike in April. Most of the collieries are well booked into early April. France is in the market for gas and coking coals. German demand is slow and Scandinavian inquiries are hampered by ice in the Baltic. The French State Railways are asking tenders for 100,000 tons of Durham coking coals for delivery over the next six months.

Production by British collieries during the week ended March 8 a cable to *Coal Age* states, was 5,742,000 tons, according to the official reports. This compares with 5,702,000 tons in the week ended March 1.

Hampton Roads Business Slumps; Storms Hamper Shipping

Business at Hampton Roads during the last week has been slower than for many weeks, prices taking a slump and consumers apparently using all their old contracts prior to the new contract period, beginning April 1. Fair dumping at the piers was mostly of coal sold on old orders.

Recent storms have had the effect of

tying up shipping to a great extent, and many vessels were long overdue for cargoes. The result was a piling up of approximately 7,500 cars of coal, with nearly 500,000 tons at Hampton Roads piers. Coastwise business is slack, and the bunker trade fair. Overseas shipments of spot coal were negligible.

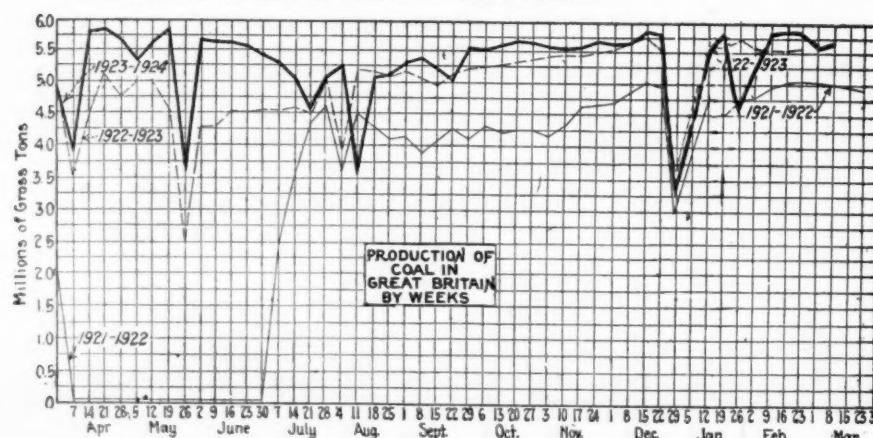
The tone of the market is weak, with little hope for better business before April 1. Overproduction also is indicated in advices from operators to agents.

French Producers Balk at Wage Rise; Markets Active

Wage negotiations in the coal fields hold the center of interest in the French coal market now. The wage settlement arranged last November was to be effective until Feb. 29. Because of higher living costs the miners, at a recent meeting asked not only for the maintenance of the old wage, but for a further increase. Having just reduced their selling prices the companies refused to accede to the demand, but agreed to maintain the present rates to the end of June. Although the miners are not entirely satisfied with the terms, there was no threat of a strike, though there may be some trouble raised by extremists.

Demand for household coals continues to be rather active, but owing to a shortage of trucks, the collieries have to store their output. Inquiry for industrial coal is larger and the output sells freely, and the movement would be greater still if supplies were sufficient.

Production in the Ruhr is steadily increasing, and Allied reparations shipments in February were only a quarter of a million tons below the reparations program. A new organization has been formed to succeed the S. C. O. F. in distribution of reparations coal, but the extent of its functions has not yet been defined.



According to statistics for the last quarter of 1923, just given out, for all French mines, the production is 810 kilograms (about 1,782 lb.) per day per underground worker and 569 kilograms (about 1,242 lb.) for underground and surface. Before the war, the average daily production per day was 978 kilograms (about 2,156 lb.) per underground worker and 695 kilograms (about 1,529 lb.) for underground and surface.

Progress in the restoration of the devastated mines of the Nord and Pas-de-Calais is indicated by the fact that production of coal in January totaled 2,082,821 tons; coke, 140,663 tons and patent fuel, 156,875 tons, compared with December output of 1,834,015 tons of coal, 133,364 tons of coke and 147,864 tons of patent fuel.

Export Clearances Week Ended March 24, 1923

FROM BALTIMORE

	Tons
For Dutch Guiana	
Am. Schr. Isabelle Parmenter.....	1,230
For Argentina	
Fr. AA Lierentz.....	6,202
For Porto Rico	
Am. Str. Gov. John Lind.....	822

FROM HAMPTON ROADS

	Tons
For West Indies	
Nor. Fram for Curacao.....	4,054
For Jamaica	
Nor. Str. Geflon for Kingston.....	2,186
For Brazil	
Du. Str. Hardenberg for Santos.....	4,879

FROM PHILADELPHIA

For Cuba	
Nor. Str. Asbjornsen for Havana....	

Hampton Roads Pier Situation

March 13 March 20

	Cars on hand	Tons
Cars on hand	2,212	2,601
Tons on hand	129,096	153,717
Tons dumped for week	155,098	152,104
Tonnage waiting	10,000	12,000

	Cars on hand	Tons
Virginian Ry. piers, Sewalls Pt.:		
Cars on hand	1,730	2,016
Tons on hand	117,450	138,200
Tons dumped for week	86,650	63,353
Tonnage waiting	10,000	10,791

	Cars on hand	Tons
C. & O. Piers, Newport News:		
Cars on hand	1,920	2,346
Tons on hand	90,385	117,685
Tons dumped for week	69,383	88,867
Tonnage waiting	5,750	50

Pier and Bunker Prices, Gross Tons

PIERS

	March 15	March 22†
Pool 9, New York.....	\$4.75@\$5.25	\$4.75@\$5.25
Pool 10, New York.....	4.60@ 5.00	4.60@ 5.00
Pool 11, New York.....	4.50@ 4.75	4.50@ 4.75
Pool 9, Philadelphia....	4.90@ 5.20	4.90@ 5.20
Pool 10, Philadelphia....	4.50@ 4.90	4.50@ 4.90
Pool 11, Philadelphia....	4.25@ 4.60	4.25@ 4.60
Pool 1, Hamp. Roads....	4.65@ 4.75	4.50
Pool 2, Hamp. Roads....	4.40@ 4.50	4.25
Pools 5-6-7 Hamp. Rds....	4.10@ 4.20	4.10@ 4.15

BUNKERS

Pool 9, New York.....	5.05@ 5.55	5.05@ 5.55
Pool 10, New York.....	4.90@ 5.30	4.90@ 5.30
Pool 11, New York.....	4.80@ 5.05	4.80@ 5.05
Pool 9, Philadelphia....	5.15@ 5.55	5.15@ 5.55
Pool 10, Philadelphia....	4.90@ 5.20	4.90@ 5.20
Pool 11, Philadelphia....	4.65@ 5.10	4.65@ 5.10
Pool 1, Hamp. Roads....	4.75	4.60
Pool 2, Hamp. Roads....	4.50	4.35
Pools 5-6-7 Hamp. Rds....	4.20	4.10@ 4.15

Current Quotations British Coal f.o.b.

Port, Gross Tons

Quotations by Cable to *Coal Age*

	March 15	March 22†
Cardiff:.....		
Admiralty, large.....	31s. @ 32s.	32s. @ 33s.
Steam smalls.....		23s.
Newcastle:.....		
Best steams.....	25s. 9d. @ 26s.	26s. @ 26s. 3d.
Best gas.....	25s. @ 25s. 3d.	25s. @ 25s. 6d.
Best bunkers.....	23s. @ 23s. 6d.	25s.

† Advances over previous week shown in heavy type, declines in italics.

Traffic News

Rates in Bash-B. & O. Case Not Unreasonable

Interstate Commerce Commission Examiner Carter has recommended to the commission that findings substantially as follows be submitted in the case of C. E. Bash & Co. vs. the Baltimore & Ohio R.R.:

"Rates on bituminous coal from Ohio and the inner and outer crescents to various Indiana points are found not unreasonable, unjustly discriminatory or unjustly prejudicial except as provided in the commission's orders in the Ohio-Michigan coal cases and the Indiana State Chamber of Commerce case.

"Rates on bituminous coal, carloads, from Ohio to Huntington, Ind., prior to March 1, 1922, are not unreasonable.

"Rates from West Virginia to Gary and Michigan City during the period from Aug. 26, 1920, to June 30, 1922, were not unreasonable.

"Rates from the inner and outer crescents and from Cincinnati to Ben Davis, Ind., have not been and are not unreasonable.

"Rates from Louisville & Nashville mines in Kentucky to Wabash, Ind., from June 11, 1920, to Sept. 14, 1921, were not unreasonable."

Central Indiana R.R. Now in Better Condition

Recall of an order for sale of the Central Indiana R.R., a coal line operating between the southern Indiana coal fields and Muncie, and which has been in the hands of a receiver, William P. Herold, of Indianapolis, for several months, was issued recently in federal court by Judge A. B. Anderson. The order was issued on petition of the Central Trust Co., of New York, trustee for the bondholders, in which it was set forth that the decree and judgment of the court in favor of the company had been complied with, and asking the return of the railroad property to the Central Indiana Corporation, with the exception of the cash and accounts of the receiver. The stock is held by the Big Four and Pennsylvania railroads, which, it is understood, will continue to operate the railroad.

Modifies Western Rate Findings In Wyoming-Colorado Traffic

The Interstate Commerce Commission has modified its findings in the Western coal-rate case in so far as it applies to interstate rates from Rock Springs-Kemmerer to certain points in Colorado. The commission points out that in view of the substitution of certain rates by the Wyoming commission and with these intrastate rates in effect, the rate relationships which were found proper at Cheyenne, where the coals meet, will be disturbed to the disadvantage of the Colorado operators unless a

modification is prescribed. "The rates which the Wyoming commission now has prescribed," says the commission's decision, "may be used for the purpose of fixing relationships with the interstate rates from the Colorado district."

Seek Lower Short-Haul Rates In West Virginia

Several chambers of commerce and industries in the northern part of West Virginia having asked an adjustment of rates on fuel from the mines to distances not to exceed ten miles, a hearing was held by the Public Service Commission of West Virginia about the middle of March. A general reduction of about 10 per cent is asked, the complainants contending that short-haul rates on fuel in West Virginia are higher than similar rates in Ohio and Pennsylvania. The Public Service Commission inquired as to the absence of traffic officials of the railroad companies and indicated that unless traffic officials appeared, the commission would be disposed to grant the request of the complainants.

Indiana Roads to Fight Rate Cut

Indiana railroads have decided to oppose the order of the Indiana Public Service Commission for a reduction, effective April 1, in freight rates on coal amounting to approximately 10c. a ton. The reduction, the roads contend, means an annual loss in revenue of about half a million dollars. It will be contested in the courts, the way to carry it to the courts having been paved when the Indiana commission refused the carriers a rehearing. On the refusal it is possible to file briefs in court against the cut, which was obtained through the Indiana Chamber of Commerce, Indiana coal operators and the United Mine Workers of Indiana.

Final Argument on Hard-Coal Rate From Buffalo to Twin Cities

Final argument on the rescinding of the joint rate on hard coal from Buffalo to the Twin Cities will be heard on March 28. The Twin City Coal Exchange will be represented by its attorney, S. B. Houck, of Minneapolis.

I. C. C. Suspends Cancellation Order

The Interstate Commerce Commission on March 19 suspended until July 18 certain schedules which proposed to cancel rates on bituminous coal from mines in Kentucky, Virginia and West Virginia moving via La Crosse, Ind., in connection with the Pere Marquette Ry. to certain destinations in Michigan and Wisconsin, which would result in the application of highest combination rates via the eliminated routes.

Industrial Notes

As the result of a recent survey the General Electric Co. has established service and repair shops at Atlanta, Chicago, Los Angeles, New York, Kansas City, Minneapolis, Oakland, Philadelphia, St. Louis and Seattle, in addition to such service maintained at the factories. Each of these shops has the personnel and facilities for any form of service work on machines up to 500 hp., some of the larger shops being equipped to handle apparatus of any size. These shops also are prepared to furnish competent men on short notice in case of accidents or for any emergency work.

The name of the business heretofore conducted as L. A. Green has been changed to the L. A. Green Railway Equipment Co., First National Bank Building, Pittsburgh, Pa. The policy, purpose, personnel and organization of the company remains unchanged. The company distributes rails, machinery and equipment for mills, mines and contractors and manufactures "Durabil" steel frogs, switches and crossings.

Obituary

Henry Kulp Stauffer, vice-president of the Pittsburgh Terminal Coal Co., of Pittsburgh, Pa., died March 12 at his home in that city, aged 51. Mr. Stauffer entered the coal business 31 years ago as a clerk in the employ of the Berwind-White Co., at Punxsutawney. Later he was associated in various capacities with the following companies: David E. Williams & Co., Allport Coal Co.; Flenner, Hendrickson & Stauffer, Watkins Coal Co., Lennox Coal Co., B. Nicoll & Co., and since last November as vice-president in charge of sales for the Pittsburgh Terminal Coal Co. He leaves a wife and two daughters and is also survived by his brother, J. C. Stauffer, of W. L. Irish & Co., and by his mother.

Coming Meetings

Association of Iron and Steel Electrical Engineers. Fuel Saving Conference, April 2 and 3, William Penn Hotel, Pittsburgh, Pa. Secretary, J. F. Kelly, Empire Bldg., Pittsburgh, Pa.

Canadian Retail Coal Association. Annual meeting, April 3 and 4, King Edward Hotel, Toronto, Ont., Can. Secretary, B. A. Caspell, Brantford, Can.

American Institute of Electrical Engineers. Spring convention, April 7-10, Birmingham, Ala. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

American Welding Society. Annual meeting, April 22-24, Engineering Societies Building, 33 West 39th St., New York City. Secretary, W. M. Kelly, 33 West 39th St., New York City.

National Exposition of Coal Mining Equipment and Machinery of the American Mining Congress. May 12-17, Cincinnati, in conjunction with the annual meeting of the National Coal Association.

National Coal Association. Annual meeting, May 14-16, Cincinnati, Ohio. Executive Secretary, H. L. Gandy, Southern Building, Washington, D. C.

International Railway Fuel Association. Sixteenth annual convention, May 26-29, Chicago, Ill. Secretary, J. G. Crawford, Chicago, Ill.

The American Society of Mechanical Engineers. Spring meeting May 26-29, Cleveland, Ohio. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

The National Foreign Trade Convention. June 4-6, Boston, Mass. Secretary, O. K. Davis, 1 Hanover Square, New York City.

National Retail Coal Merchants' Association. Annual meeting, Hotel Virginian, Bluefield, W. Va., June 4-6. Secretary, Walter D. Rogers, Transportation Building, Washington, D. C.

American Society for Testing Materials. Annual meeting, Chalfonte Hotel, Atlantic City, N. J., June 23-27. Secretary, Edgar Marburg, University of Pennsylvania, Philadelphia, Pa.

News Items From Field and Trade

ALABAMA

Chickasaw Shipbuilding & Car Co., Fairfield, subsidiary of the steel corporation, has been awarded a contract for 1,800 freight cars by the Louisville & Nashville R.R., which is 47 per cent of a total of 3,900 cars which the railroad company has placed orders for. The Chickasaw order represents an expenditure of \$4,200,000. The Southern Ry. also has placed an order with the above company for 750 hopper cars.

Salmon & Cowin, mining engineers and contractors, Birmingham, have been incorporated with an initial capital stock of \$3,000, to do a general engineering business. Herbert S. Salmon is president; Percy C. Cowin, vice-president and treasurer.

The Wadsworth-Cahaba Coal Co., Inc., Birmingham, has increased its capital stock \$23,000.

ILLINOIS

The Operators' Association of the 5th and 9th Districts has decided to restrict its activities and expenses by discontinuing its statistical department. Paul H. Greenlaw, of St. Louis, Mo., who is in charge of statistics and has been associated with the organization for eight years, will sever his connection as soon as he winds up the department's affairs. During the Fuel Administration he was appointed assistant district representative by Dr. H. A. Garfield, U. S. Fuel Administrator, and Deputy Fuel Distributor by Wallace Crossley, Federal Fuel Administrator for Missouri. During the strike of 1919 he was appointed member of the Southwestern Regional Coal Committee by Dr. Garfield, and by this committee was chosen its chairman.

The Meilke brothers, Rudolph, Fred and Herman, have bought Section 1 coal mine, located about three miles southeast of Coal Valley. It was formerly owned and operated by J. M. Pryce and son. The mine employs about twenty-five men. Mr. Pryce was formerly the operator of the Eureka mine, located one mile southwest of Coal Valley. This mine closed about two years.

Mine No. 2 of the Mount Olive & Staunton Coal Co., near Williamson, produced 5,128 tons of coal March 4, which was a record for that mine and is said to be the record for Madison County. The mine is 317 ft. deep, the deepest in the county. This mine operated 212 days last year, more than any other mine in the county and produced 787,792 tons of coal, also the peak for Madison County. Normally, 700 men are employed.

Production of 400 tons of coal has now been reached by the Shuler Coal Co., at its new mine at Alpha. Operation of the mine was begun last fall and production has steadily been increased. A considerable part of the output is sold in the Davenport-Rock Island-Moline district.

The Superior Coal Co., at its No. 1 mine, Gillespie, hoisted 3,001 tons of coal March 3, in eight hours. To accomplish this output 1,625 mine cars were hoisted at the rate of 203 pit cars per hour, which required a railroad train of 103 cars to convey from the mine.

On March 12 the Kathleen mine, at Dowell, brought up 5,286 tons, breaking its record again. The prior record was 5,262 tons.

INDIANA

Charles W. Whitlock, an attorney, was named receiver by Judge John P. Jeffries in Terre Haute, for the Otter Creek Coal Co., following the filing of a suit by the Wolverine Coal & Mining Co., of Chicago, in Circuit Court, against the Otter Creek Co., asking for a receiver.

KANSAS

Five months back pay to Alex Howat, deposed president of District 14 of the union, was proposed at the March convention of the District. John L. Lewis, International president, checkmated this attempt to aid the disturber, Howat, by

warning the district that if it made such payment it would be prosecuted for misappropriation of union funds. The convention then directed the district board to appeal the matter to the International executive board.

KENTUCKY

The Merchants Ice & Cold Storage Co., Louisville, has placed a contract for Harlan screenings at \$1.50 a ton. A contract which had until June to run was cancelled as of March 15 giving the company the advantage of 15c. a ton over the period to June, when the old contract would have expired according to an official of the company. It is said that the contract went to the Blue Diamond Coal Sales Co., Cincinnati, and that the former contract was at \$2.25, later scaled down to \$1.65.

MARYLAND

The J. D. Walker Coal Co. has purchased property in Caton Ave. near Frederick Ave. on the Pennsylvania R.R., Baltimore, for a coal yard that is to be one of the largest in the city. The company, which mines its own anthracite and bituminous coal, will specialize in a substitute for anthracite, which is intended especially for households.

MISSOURI

The Harmony Coal Co. of Kansas has been incorporated to do business in Missouri and will have headquarters in Foster. The company will mine coal and sell it at wholesale and retail. W. R. Schooley, of Foster, is the principal agent in Missouri.

The Central Coal & Coke Co., Kansas City, announces the appointment of G. L. Parsons as general sales manager and of F. H. Oliver as sales manager.

John Woodruff, a coal miner, has sued the United Mine Workers for \$30,000 damages for injuries he says he received three years ago when a crowd of union miners from Richmond visited a mine near Excelsior Springs where he worked and tried to convince non-union men they should join the union.

The Federal Trade Commission has issued a complaint against the Boehmer Coal Co. of St. Louis, charging it unfairly represented its coal to be "Victory coal," causing the trade to confuse this with "Victory coal" produced by the Victory Collieries Co.

NEW YORK

Stockholders of the **Consolidation Coal Co.** have approved the issue of \$10,000,000 7 per cent cumulative preferred stock. It will be offered to stockholders of record March 29, at par on the basis of one share for each four shares of common.

Governor Smith on March 21 signed the McGinnies bill as chapter 55 of the laws of 1924, amending chapter 581 of the laws of 1923, entitled "An act making an appropriation for the preparation of plans and specifications by the State Engineer and Surveyor for the construction of tipplers for coal at Ithaca and Watkins, with a view of facilitating the transportation and delivery of coal" by extending until Feb. 1, 1925, the time such report shall be filed and providing for an estimate of cost to accompany such report of needed equipment and facilities. A reappropriation of \$9,782.27 is made to carry out the provisions of the act.

The Consolidation Co. reports for the year ended Dec. 31, 1923, a net income of \$2,585,473, equal to \$6.43 a share on the \$40,205,448 capital stock outstanding after deducting depreciation, interest, federal taxes, etc. This compares with a net income of \$2,558,445, or \$6.36 a share, on the same amount of capital stock outstanding as of Dec. 31, 1922. The surplus for the year amounted to \$173,403, as compared with \$146,411, making the profit and loss surplus \$5,485,735 against \$5,442,955 for 1922. As of Dec. 31, last, the current assets stood at \$21,824,164 and current liabilities \$18,810,843 leaving net working capital of \$3,013,321, as compared with \$15,827,416 at the close of 1922. During

the year the company advanced substantial funds to carry forward the development of its mines in the Pocahontas-New River Division, acquired in 1922, says President Watson. It also was found possible, he added, to re-enter foreign markets on a somewhat larger scale. The increased expenditures required for this expansion account for the principal increases in the floating indebtedness of the company, according to Mr. Watson. F. W. Wilshire, vice-president, has been elected to the board of directors to succeed Frank Anschul.

Arthur Lathrop Zerby, formerly with W. A. Marshall & Co., has joined the **Fuel Service Co.**, 17 Battery Place, New York City, as vice-president.

NORTH CAROLINA

The first trainload of coal mined in North Carolina was hauled into Raleigh by the Norfolk-Southern R.R. The train consisted of 18 standard cars, each carrying 50 tons of coal. Ten cars of this coal came from the Cummock mine, in Lee County and eight from the new Carolina mine. The Norfolk-Southern has been using this regularly for many months and finds it satisfactory for railroad purposes. This shipment was the first of such magnitude to be hauled away from these North Carolina mines, but it promises to be the precursor of thousands of other shipments.

OHIO

"**Getting the Most Out of Your Coal Pile**" is the title of a booklet being distributed by the Columbus Coal & Lime Co., of Columbus. The booklet is not an advertisement for any particular brand of coal or any make of heating apparatus but to insure the coal users of getting the most heat from fuel. Methods of firing suggested for different coals are said to be the result of tests made by the author, L. R. Taylor, during his years as a heating engineer. In his introduction Mr. Taylor says: "Method of operation, although it may not be so recognized, is unquestionably the prime factor in determining fuel consumption and freedom from operating troubles, no matter what fuel is being used."

Suit for the recovery of \$84,000 was filed in the federal court at Columbus by the ten heirs of the late Lorenzo D. Lively, of Jackson, against the Chapman Coal Co., of Columbus. The heirs of Lively, who died in 1901, claim that in 1919, 1920 and 1921 the Chapman Coal Co. wrongfully forced underground entries into 30 acres of land of the Lively estate and removed 12,158 tons of coal, for which the above amount is sought. The plaintiffs in the action are widely scattered.

William O'Toole, former vice-president of the central Pocahontas Coal Co. and minister to Paraguay, arrived on the Str. "Southern Cross" at New York on March 17, for a furlough of three months in this country. A telegram to manager Heitzman at Cincinnati carried the information that he intended to visit former acquaintances in Cincinnati after a few weeks at Welsh and a visit to his father, General O'Toole at Gary, W. Va.

PENNSYLVANIA

By a unanimous vote of the stockholders the capital stock of the **Lehigh & Wilkes-Barre Coal Co.** has been increased from \$10,000,000 to \$30,000,000 divided into \$10,000,000 7 per cent preferred and \$20,000,000 in common stock. The increase, it was said, was to bring the authorized capital in line with the price paid for the purchase of the coal company's holdings from the Central Railroad of New Jersey. Officers were elected as follows: C. F. Huber, president; Douglas Bunting, vice-president and general manager; Daniel Anthony, vice-president and general agent; Charles E. Ash, secretary-treasurer and Jackson E. Reynolds, John L. Kemerer, S. B. Thorne, George R. McLean, Gilbert S. McClintock and Douglas Bunting, directors.

There were 180 fatal accidents in the mines of Pennsylvania during the first two months of 1924, the number being unusually high because of the mine catastrophe in Indiana County on Jan. 26, when 37 lives were lost. In January, according to the records of the Bureau of Workmen's Compensation of the State Compensation Board, there were 39 fatalities in the anthracite mines and 65 in the bituminous mines. In February there were 46 deaths in the anthracite and 30 deaths in the bituminous mines. The total compensation paid or awarded, including \$550,146 awarded in fatal cases, amounted to \$751,974 in January, and \$784,811 in

February, including the sum of \$444,727 paid or awarded in fatal cases.

The partnership of Geo. E. Henry & Son, of East Brady, will be dissolved April 1 and its affairs terminated as promptly as possible. J. Wilson Henry is organizing the Henry Coal Mining Co., which will take over the business. None of the assets or liabilities of the partnership will be transferred to the new company which will stand on its own feet.

VIRGINIA

The City of Norfolk is asking for bids on 9,000 tons of steam coal, and the State of Virginia is asking for bids on 60,000 tons of steam coal. The Chesapeake & Ohio R.R. is in the market for 1,800,000 tons, and Norfolk agencies will submit bids in all cases.

WEST VIRGINIA

With a view to operating on a large scale the **Big Otter Collieries Co.** has been organized with a capitalization of \$300,000, the general offices of the company to be at Wheeling. Principally interested in the new coal corporation are J. E. McClay, Charleston; R. J. Cotts, R. B. Herndon, H. A. Crowther, of Wheeling, and C. E. Mollohan, of Heaters.

The Philadelphia & Cleveland Coal Co. has begun excavations for its new coal-loading terminal on the Ohio River at Twenty-sixth Street, in Huntington—an improvement which will involve an expenditure of about \$150,000. At the new terminal the company will transfer coal coming from the mines in cars to barges and will ship to Addyston, Ohio, near Cincinnati, where the coal will again be loaded into cars and shipped to the Lakes or to inland Western markets. The company has already expended about \$250,000 on its plant at Addyston. In building a river loading tipple at Huntington the company is arranging to install from 1,800 to 2,000 ft. of track together with a concrete overhead crossing at Twenty-seventh street. After the coal has been dumped into a large concrete basin it will be conveyed through a trench-like arrangement on a broad rubber conveyor to the barges where there will be a fall of not more than 4 ft. It will require about six months to complete work on the Huntington river terminal.

The Banfi Coal Co., of Follansbee, has been organized with a capital stock of \$25,000, the general offices of the company to be at Follansbee. Actively interested in this company are Andrew M. Helen M. and John M. Banfi, all of Follansbee.

The Three States Coal Co. with general offices at Bluefield, at its annual meeting elected officers as follows: C. A. Clyborne, president; F. T. Beazley, vice-president; J. Coy Pearce, secretary; V. H. Campbell, treasurer. The treasurer of the company also will act as assistant to the president. He was until recently district manager of the W. E. Deegans Coal Co., of New York.

The Sitnek Coal Mining Co. has elected the following directors: Louis Sitnek and R. L. Rankin, of Philadelphia; S. H. Harold, of Uniontown, Pa.; Edwin Cramp, of Fairmont, and Harvey H. Staggers, of Fairmont. The directors elected the following officers: Louis Sitnek, president and general manager; Edwin Cramp, general superintendent; R. L. Rankin, secretary and treasurer; H. H. Staggers, assistant secretary. The Sitnek company recently purchased the Katherine mine of the Antler Coal Co. at Lumberport, and is making extensive improvements, including the installation of mechanical loading machines. These machines are said to be the first to be tried out in the Pittsburgh seam in northern West Virginia. According to general report, the company will extend its holdings in northern West Virginia.

A meeting of the stockholders of the Killarney Smokeless Coal Co. of Killarney; the Ingram Branch Coal Co., of Ingram Branch; and the Smith Pocahontas Coal Co., of Calicor, was held at Lynchburg, Va., about the middle of March, when Green H. Nowlan, of Lynchburg, was elected to succeed the late James Gorman as president of the three concerns.

M. M. Tyree and associates, of Huntington, who recently organized the **M. M. Tyree Coal Co.**, with a capital stock of \$100,000, have moved into offices in the Robinson-Prichard Building, in Huntington, about the middle of March.

The Lawrence E. Tierney Fuel Co. has moved its general office from Powhatan to Bluefield.

The Wysong-McCoy Coal & Land Co., with extensive coal and timber holdings in Webster County, on the Baltimore & Ohio R.R., has been reorganized as the Multi-Seam Coal & Land Co. and arrangements are being made to refinance this company and put it on a sound running basis, according to news from the general office of the company at Princeton. S. J. Evans is president of the reorganized corporation.

Employees are to be given the opportunity to buy stock in the Bethlehem Mines Corporation, a subsidiary of the Bethlehem Steel Corporation, which marks a new departure in the policy of the mining company at least in so far as the Barrackville and Dakota mines, in the Fairmont region, are concerned. The plan is to be known as the "Employees Saving and Stock Ownership," by which an employee may subscribe for shares of stock at the rate of one share for each \$400 annual earnings. The price on the first year's offerings will be \$94 per share. The plan makes provision for credits of dividends and interest charges that will result in a net cost to the employee substantially below the purchase price. As an added incentive to employees to hold the stock and to continue in the employ of the corporation, it has been agreed to make special bonus payments every year for five years from the time stock is purchased, amounting to \$1 per share for the first year; \$2 per share for the second year and so on up to \$5 per share at the end of the fifth year.

Rumors of a sale of the Simpson and Galloway mines, three in all, and of 2,700 acres of Pittsburgh coal land in Barbour and Taylor counties by the Simpson Creek Coal Co. to the Simpson Creek Collieries Co. have been confirmed by an announcement made at the annual meeting of the first-named company. The officers of the purchasing company are identified with the Hanna interests of Cleveland and with the Youghiogheny & Ohio Coal Co. of that city.

John J. Lincoln, one of the well-known operators of the Pocahontas field, has invited the American Institute of Mining and Metallurgical Engineers to visit the Pocahontas district on its annual tour next October.

The Rosebud Coal Co., of Clarksburg, and the **Gilbert-Fairmont Mining Co.** have just been organized by virtually the same interests, the former company having a nominal capital and the latter \$50,000. Active in organizing the Rosebud company were J. M. McDonald, of Cincinnati; D. Kinnard, Karl B. Kyle, C. M. Barnes and L. J. Shahan, of Clarksburg. Incorporators of the Gilbert-Fairmont company were H. F. Mannix, of Cincinnati; K. B. Kyle, James A. Laislip, C. M. Barnes and L. J. Shahan of Clarksburg. W. VA.

Milburn By-Products Coal Co. at Milburn is installing a Roberts & Schaefer revolving dump and belt conveyor machinery.

The Meriden Smokeless Coal Corporation has just been organized with a capital stock of \$250,000 and with headquarters at Elkins and Meriden. The names of E. A. Bowers, William A. Arnold, Bertram Berger, G. B. Southward and A. H. Hoefar, all of Elkins, appear as incorporators, some of them being connected with the West Virginia Coal & Coke Co.

Latest information concerning the organization of the **Meriden Smokeless Coal Co.**, capitalized at \$250,000 is to the effect that this simply represents a reorganization of the Albert Thompson interests and is for the purpose of giving title to the estate. W. H. Cunningham, of Huntington, has been elected president and Lee J. Sandridge of Philippi vice-president and general manager. The company operates at Meriden,

Of the total of 70,188,203 gross tons of coal produced in the mines of West Virginia in 1922, it is shown by the report of the State Department of Mines that there was produced of the Monongahela series, No. 15, a total of 14,652,987 tons; of the Conemaugh series No. 14, or Elk River, series a total of 1,916,895; of the Alleghany-Kanawha series No. 19, a total of 24,195,779 tons and of the Pottsville-New River-Pocahontas series No. 12, a total of 29,422,542 tons. Production in the same year by geographical districts was as follows: Panhandle, 3,796,904 gross tons; Fairmont district, 9,625,112 gross tons; Preston-Barbour district, 3,066,657 gross tons; Elk Garden, 1,080,042 gross tons; Mason, 48,253 gross tons; Putnam, 170,552 gross tons; Kanawha, 6,110,150 gross tons; New River, 11,900,162 gross tons; Logan, 13,904,980 gross tons; Pocahontas, 18,354,975 gross tons; Mingo, 2,130,416 gross tons; small wagon mines, 700,000 gross tons.

Fourteen resident and one non-resident coal corporations were organized in West Virginia in January with an aggregate capital stock of \$3,055,000, as follows: Agee Coal Co., of Huntington, \$200,000; R. S. Smith Coal Co., of Huntington, \$100,000; Gilbert Fairmont Mining Co., of Clarksburg, \$50,000; Rosebud Coal Co., Clarksburg, \$50,000; Brockman Smokeless Coal Co., of Charleston, \$300,000; Monarch Smokeless Coal Co., of Bluefield, \$400,000; Bonafield Coal Co., of Tunnelton, \$125,000; Braxton Fuel Co., of Clarksburg, \$25,000; Miners & Consumers Coal Co., of Huntington, \$275,000; Mine-to-Consumers Coal Co., of Martinsburg, \$25,000; Otter Creek Coal Co., of Hambleton, \$5,000; Dry Fork Sewell Coal Co., of Clarksburg, \$25,000; Meriden Smokeless Coal Co., of Meriden, \$875,000; Kistler Coal Company of Kistler, \$550,000; Sanderson Mining Co., of Greensburg, Pa., \$50,000.

WASHINGTON, D. C.

The Navy Department awarded contracts for 24,600 tons of navy standard coal to be delivered in April, May and June to the Government Fuel Yard, at Washington, to the **Lake & Export Coal Co.**, at \$2.22 net mines; **Raleigh Smokeless Fuel Co.**, \$2.24, and **C. G. Blake & Co.**, \$2.24, each taking an equal share of the contract.

CANADA

The outlook for coal mining on Vancouver Island is blue. Owing to the general slackness of the coal trade on Vancouver Island, the Canadian Collieries, Ltd., has closed its South Wellington mines and the Granby Consolidated Mining, Smelting & Power Co. has reduced the working crew at its Cassidy Colliery 50 per cent. It is steadily replacing smelting with concentration, thus reducing its coal needs. Some of the men at the South Wellington mines are being given employment at the Wellington Extension mine. Unless some other outlet is found for the coal the cut of the crew at the Cassidy colliery is likely to be permanent. The bulk of the Cassidy coal is high in ash, and does not find a ready market. For smelting purposes, of course, it is crushed and washed before conversion into coke, so the high ash does not matter so much.

Gordon F. Dickson, general manager of the Blue Diamond Coal Mines at Brule, Alberta, has left for eastern Canadian points. Production at Brule has ceased since the discontinuance of coal orders by the Canadian National Ry.

The Pacific-Alberta Coal Bunkering Co. Ltd., has been organized, with an authorized capital of \$300,000, for the purpose of erecting coal bunkers for Alberta coal at Vancouver and possibly other towns on the British Columbia coast.

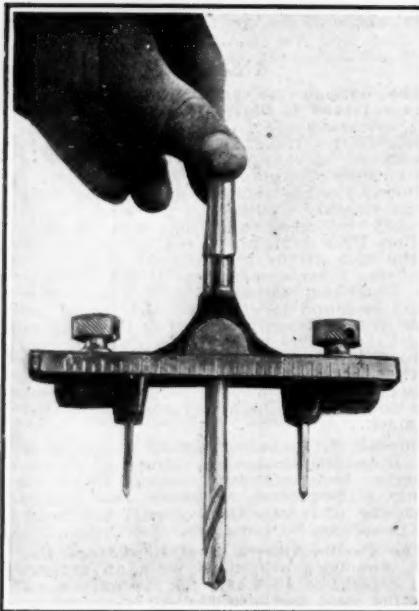
Association Activities

At the annual meeting of the **Pittsburgh Vein Operators' Association**, held at Cleveland March 11, Ezra Van Horn, general manager of the Clarkson Coal Mining Co., was elected president of the association, succeeding Michael Gallagher, of the M. A. Hanna Co., who had held the office three years. Mr. Gallagher led the association in difficult and intricate negotiations with the United Mine Workers and frequently was elected chairman of joint conferences for the whole central competitive field. Mr. Gallagher remains a member of the executive committee, representing the Wheeling & Lake Erie Coal Co. Walter I. Robinson, vice-president of the Youghiogheny & Ohio Coal Co., was elected vice-president. H. R. Sullivan, general manager of the Central Coal Mining Co., was re-elected treasurer. D. F. Hurd, who has been secretary for a number of years, was re-elected. The following members were elected to the executive committee: Mr. Van Horn, chairman; Mr. Gallagher; Mr. Sullivan; A. W. Dean, secretary-treasurer of the Barton and Fairview coal companies; J. L. Good, sales manager of the National Coal Co.; T. H. Johnson, secretary of the West Wheeling Coal Co., Bridgeport; J. C. Nelms, general manager of the Ohio & Pennsylvania Coal Co.; S. H. Robbins, president of the Youghiogheny & Ohio Coal Co.; C. W. Troll, president of the Troll Coal Mining Co.; Whitney Warner, vice-president of the Warner Collieries Co.; R. L. Wildermuth, vice-president and general manager of the Lorain Coal & Dock Co., Columbus; W. R. Woodford, president of the Rail & River Coal Co. Charles J. Albasin, labor commissioner, Bridgeport, was re-elected.

New Equipment

Drill for Cutting Circular Holes in Sheet Metal

A new tool is being manufactured for cutting circular holes in metal, wood or fibre by the Cincinnati Tool Co., Norwood, Cincinnati, Ohio. This device has knurled thumb screws which adjust the steel cutting blades so that the holes from 1 to 4 in. in diameter may be readily and accurately cut. The drill in the center is for the purpose of guiding the outer cutting blades so as to cut a true circle.



Drill for Cutting Large Holes

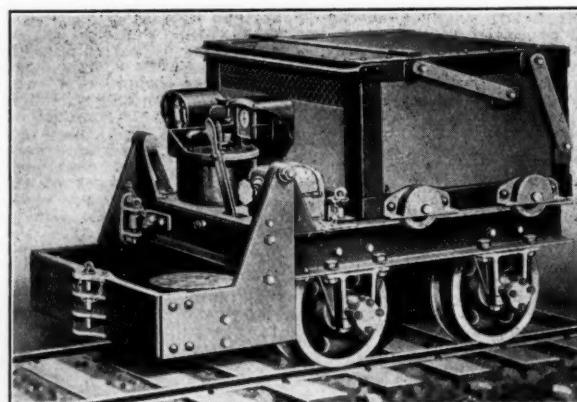
This device is designed for cutting true large size circular holes in metal, wood or fibre material. The long center drill is for the purpose of guiding the outer cutting blades.

Electric Power Trammer Readily Transferable

A small power driven caging device has been developed by the Mancha Storage Battery Locomotive Co. of St. Louis, Mo. It is known as the Mancha little trammer, and with it, mechanical haulage on every level of the mine is

Power Driven Car Trammer

This illustration shows the bumper and motorman's seat in the normal operating position. When the trammer is to be taken to a new location this bumper and seat is turned on its hinges to a position on the top of the locomotive. This arrangement shortens the over-all length.



made possible. It is built to run onto a mine cage like a coal car, and go to another level without the necessity of dismantling any part. By reason of its ingenious construction, one end of the locomotive, consisting of a bumper and seat for the motorman, can quickly be raised up over the top of the storage battery, thus shortening its total length.

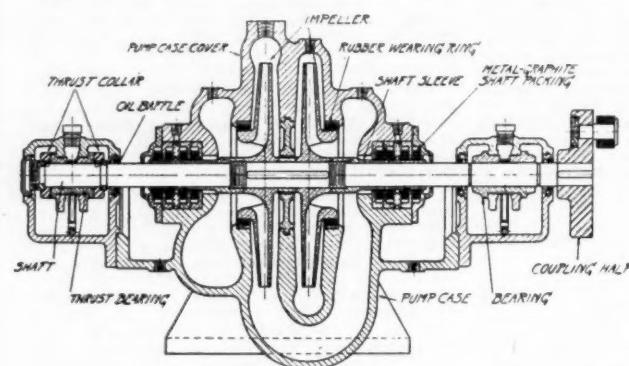
When used in places where a spare battery is kept, this device can be used continuously by changing the battery. It does away with costly, inefficient mule haulage, or hand trammimg, thus reducing cost and increasing tonnage.

The company is also prepared to furnish the necessary charging equipment for use with the trammer. Where alternating current is the only power available, motor-generator sets of suitable capacity are furnished with the battery charging panel.

The metal graphite packing rings rest lightly upon the revolving shaft, there is no pressure to retard rotation and spoil the drive shaft. This feature is especially important where the workmen are not skilled in the care of pumps.

The pump is horizontally split, and perfectly balanced. Part of this balance is accomplished by placing the two impellers of the two-stage pumps in such a position that they will be back to back. The steel shaft is protected by brass sleeves. The pumps are suitable for motor, turbine, or belt drive.

Air Cooler for Generators.—The Griscom-Russell Co., Massillon, Ohio, Bulletin No. 1216, "U-Fin Cooler," illustrates and describes a cooling device especially suited for turbo-electric generators. It is a surface type air cooler set in an enclosed duct, the air being used over and over again in cooling the windings. The cooling air is thus dry and free from dust, and in the event of fire in the windings, the oxygen in circulation is soon used up and the fire extinguishes itself.



Well-Balanced Centrifugal Pump

In the design of a new centrifugal pump it is always necessary to incorporate all points of excellence developed to date. The Moore Steam Turbine Corp. of Wellsville, N. Y., has just announced a new centrifugal pump in which they have incorporated several points of excellence.

This pump is designed so that rubber sealing rings may be used on the impeller between the suction and discharge chambers, and also for the use of metal graphite packing instead of the ordinary packing.

Centrifugal Pump

The metal graphite packing rings provided with this pump rest lightly upon the revolving shaft and are not effected by heat or moisture, thus it is possible to operate the pump with the minimum amount of leakage. These pumps are now built with either one or two stages.

Instruments, Electrical.—Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa., Circular 1664, describes indicating instruments for direct and alternating currents.

The introductory chapter of the booklet includes a brief and interesting resume of the development of electricity with special reference to the development of alternating current and the earlier alternating-current instruments.

The research that resulted in these new instruments began with analyses of all activities requiring the use of electrical measuring instruments, and all the known principles of operation and construction. In the second chapter the story of this research is related, and there, also, are discussed the principles of operation and construction of the instruments as they are now manufactured.

The remainder of the book is devoted to the instruments themselves. One chapter dwells on questions of standardization and sizes, insulation, compactness, readability, sturdiness, accessibility, simplicity, damping, accuracy and calibration. Another chapter offers a detailed description of the parts making the completed instrument. The last chapter is devoted to instrument applications. According to the company, these instruments work at a very low maintenance cost.